JULY 2, 1956

STEEL
The Metalworking Weekly

A PENTON PUBLICATION

CORES:

Forging's Bonus Baby

Payoff comes in saved metal, reduced machining, improved physicals when holes are forged in . . . page 67

production ideas
NO. 2 OF A SERIES

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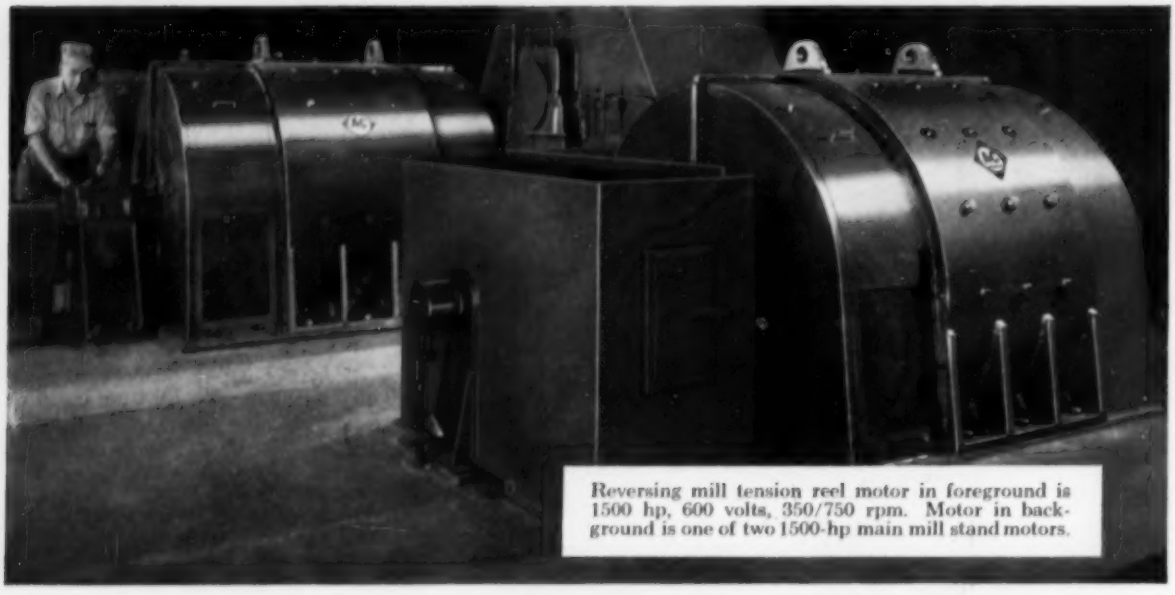
ALLIS-CHALMERS
MOTORS

Furnishing All Drive Power for New Steel Facilities

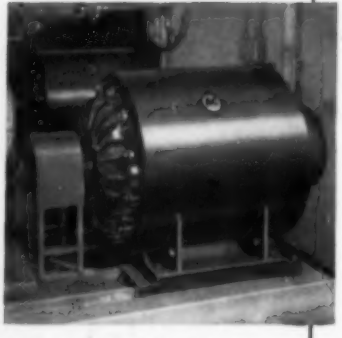


Reversing mill tension reel motor in foreground is 1500 hp, 600 volts, 350/750 rpm. Motor in background is one of two 1500-hp main mill stand motors.

Dependable Allis-Chalmers Motors Play Key Role in Steel Mill Expansion

Expansion recently completed in an eastern steel mill included two new processing lines and a new reversing mill. Allis-Chalmers application-engineered motors furnish dependable, economical drive power for these new specialized steel facilities — helping this major producer attain top steel yield.

For experienced help with *your* expansion or modernization plans, contact your local Allis-Chalmers office or write Allis-Chalmers, Power Equipment Division, Milwaukee 1, Wisconsin.



Here are Allis-Chalmers 100-hp, tube-type, TEFC explosion-proof cage motors driving pumps in oil room below the reversing mill.

NOW, you get even more winding protection with SILCO-FLEX

all-silicone-rubber motor insulation, available only on Allis-Chalmers motors — in many of the larger sizes. Ask your A-C representative for the facts about this revolutionary new insulation system.

Silco-Flex is an Allis-Chalmers trademark.

ALLIS-CHALMERS

A-5033

Special sections give auto hinges more strength at less cost

Here are two of the carbon-steel hinge sections we are rolling for automotive manufacturers. Special sections have become increasingly popular for auto and truck doors in recent years, and today are widely used throughout the industry.

Why do auto makers prefer to make door hinges from *rolled* hinge sections? Because rolling provides the needed strength, usually at less cost than any other process.

Whatever your products may be, we urge you to look into the advantages of special sections. By designing with a special section in mind, you can provide strength where it is needed, while eliminating excess metal. This means fewer machining and fabricating operations, less scrap loss. It could add up to substantial savings for your operation.

We would be happy to discuss Bethlehem carbon-steel special bar sections with you. Please contact the nearest Bethlehem sales office.

BETHLEHEM STEEL COMPANY
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On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor: Bethlehem Steel Export Corporation*

BETHLEHEM STEEL

BETHLEHEM STEEL

Braze it for 4¢ with TOCCO*

Willey's Carbide Tool Company, Detroit, reports the following benefits from TOCCO *Induction Brazing* of tool tips:

1. ***Large lathe tools: 8 times as fast. TOCCO brazes 85 per hour; former method 80 per day.***
2. ***Cost cut from 58¢ to 4¢ for each large tool.***
3. ***Small tools (¾" to ¼" square): TOCCO brazes 250 to 400 per hour.***
4. ***Two 15-KW TOCCO machines paid for themselves in three months.***

Mail coupon for information on many other brazing applications where TOCCO saves important time and money.

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Mail Coupon Today

NEW FREE BULLETIN

THE OHIO CRANKSHAFT CO.
Dept. S-7, Cleveland 5, Ohio

Please send copy of "Tool Tipping with TOCCO".

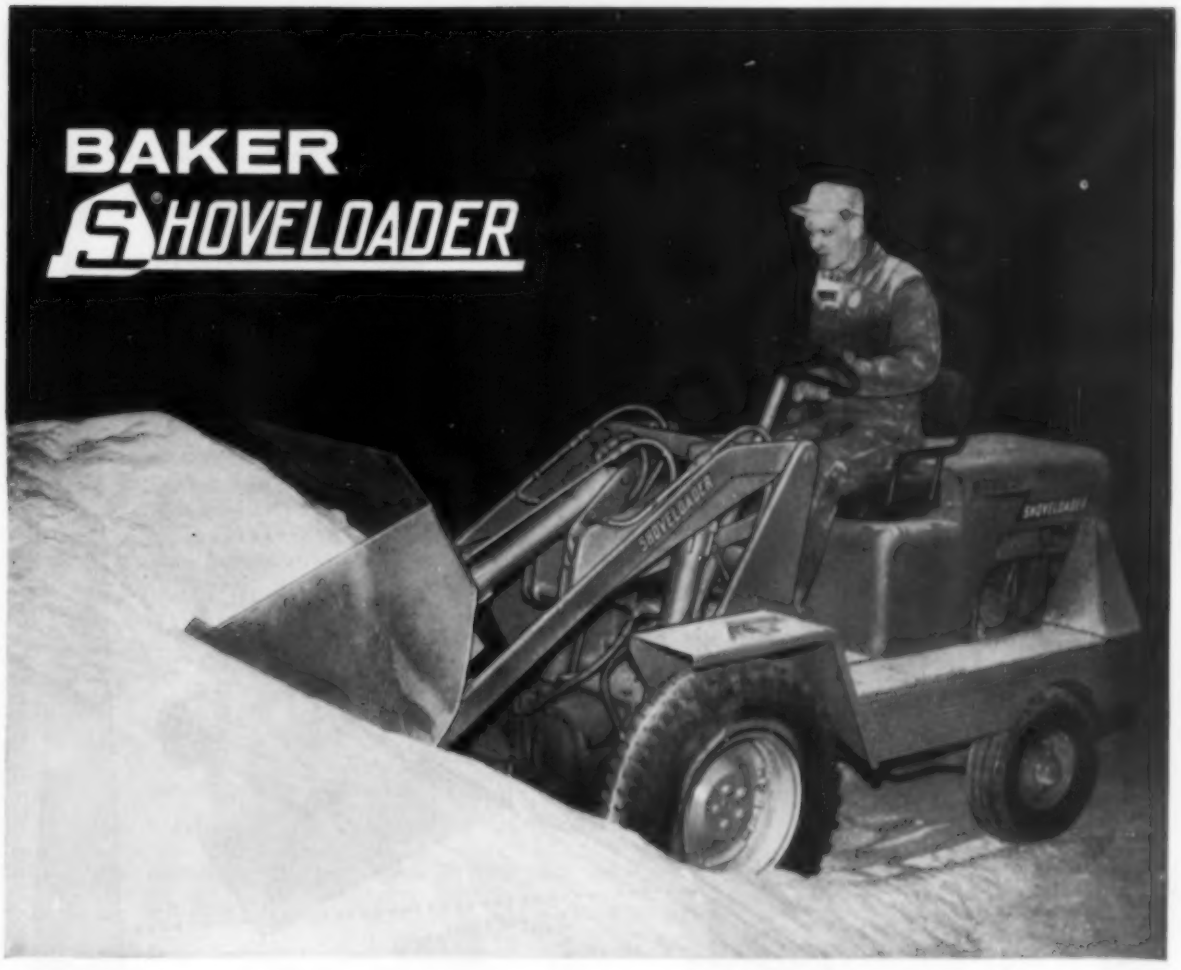
Name_____

Position_____

Company_____

Address_____

City_____ Zone____ State_____



...mechanizes your bulk handling for less per day than the cost of a laborer with a hand shovel

Baker Shoveloader costs around $400 less than comparable machines—enables you to mechanize bulk material handling for about $10 per day—less than the pay of a laborer with a hand shovel.

Designed for continuous heavy work, Shoveloader takes a 12 cubic foot bite weighing up to 1500 pounds. Four forward speeds with top speed of 14 mph make this a fast machine and insure better operation on ramps and rough ground.

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Baker handling equipment

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6581

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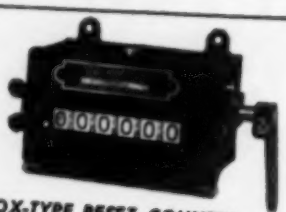
SMALL RESET COUNTER

A compact, rugged reset counter for moderate duty in parts inspection, quality control, conveyors, machine tools, light presses, etc.

Dimensions: 1¾" long, 1 15/16" high, 1 1/16" wide

Speed: Up to 1000 counts per minute.



BOX-TYPE RESET COUNTER

For punch press installations, conveyors, metal-working equipment, die casting, plastic-molding, rivet, spring and wire machining, or any installation requiring a heavy duty counter.

Dimensions: 4¼" long, 2 9/32" high, 3⅜" wide.
Speed: 500 counts per minute.

RESET MAGNETIC COUNTER

For remote indication of machine operation from plant to office.

Dimensions: 3 15/16" long, 2½" high, 1⅝" wide.

Speed: Up to 1000 counts per minute.

Coils: 110V-AC are standard. Other voltages are available. Panel mounting feature also available.

HAND TALLY

For quick spot-checks of production or performance.

Dimensions: 1 11/16" long (to end of reset knob), 1¾" deep, 2" high.

Counts one for each depression of the thumb lever, and resets to zero by a turn of the knob.

CLUTCH SPEED COUNTER

For checking to make sure that the machine is operating at the required R.P.M.

Dimensions: 3¼" long, ¾" max. diameter. Non-Reset.

Internal clutch operates counter only when rubber tip is pressed against the shaft.

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Insist on Standard

VEEDER-ROOT COUNTERS

from your

Industrial Supply Distributor

or write us on special problems

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The Metalworking Weekly

JULY 2, 1956 Vol. 139 No. 1

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WRITE FOR BOOKLET

behind the scenes

Can't Hold Presses

Any time you think you have trouble, wipe away your tears and think of Associate Managing Editor John Morgan. John heads up the news department on STEEL, and you know yourself that news is pretty tricky stuff to schedule in a weekly publication. (You'd think it ought to be "news are," wouldn't you?)

Consider the great importance attached to a steel strike. Surely an item of this magnitude deserves the closest coverage in a metalworking weekly, yet honest John finds himself bound as securely to the clock as Prometheus ever was to his rock.

"I can't splash this steelworkers' contract business," Morgan sighed, absently plucking tufts of hair from his throbbing head. "Our last news form goes to press before the steelworkers' contract expires at midnight, Saturday, June 30. If I plunge, and print a headline calling the strike, and there is *no* strike, where does that put STEEL? Worse than that, where does it put *me?* And even if I had a paddle up there, what good would it do me?"

We murmured some soothing remarks, but John was not to be comforted. "Suppose I print nothing about the climax of the contract negotiations, and on Saturday night every steel plant in the U.S. shuts down? That would make me a first-class news editor, wouldn't it?"

When this issue comes out on Monday, July 2, the only prediction STEEL will dare to carry on the strike vote will be that of Shrdlu: Since we can be only 100 per cent right or 100 per cent wrong, we're going to say the strike will be under way, and that it's exciting, being away out here on the end of a limb.

Cored Forgings

If you're allergic to lemons, this week's cover will likely cause you to pucker; seldom have we seen such a sea of yellow on our cover. Artist Art Bouhall, who spread the color with such gay abandon, declared that the design required a little color to snap it up. Some of the more cautious complained that it didn't need *that* much snapping up, but by that time Art was off and running—and it *is* a snappy cover, isn't it?

It calls attention to the second in a series of production ideas. The first was "Tubing Sells Itself to Machinists," page 103, June 4. The article this time reveals advantages and benefits of cored forgings, and if you don't know what's going on in this field, you'd better get with it, Mac, because it may save you some money.

Privately, we couldn't distinguish a cored forging from a sea cucumber, but that's not important: What *is* important is that men who know cored forgings best are finding new methods every day to increase production and lower costs.

Here is one instance where neither the Chinese nor Ben Franklin were in there first with an innovation: The English, it seems, have been making cored forgings for plumbing fittings as far back as—well, perhaps as far back as they had plumbing.

In this country, National Cored Forgings, South Norwalk, Conn., and the Aviation Division, Weatherhead Co., Antwerp, O., are making cored forgings in quantity. But here we are, giving the show away! Read the article; it's on page 67.

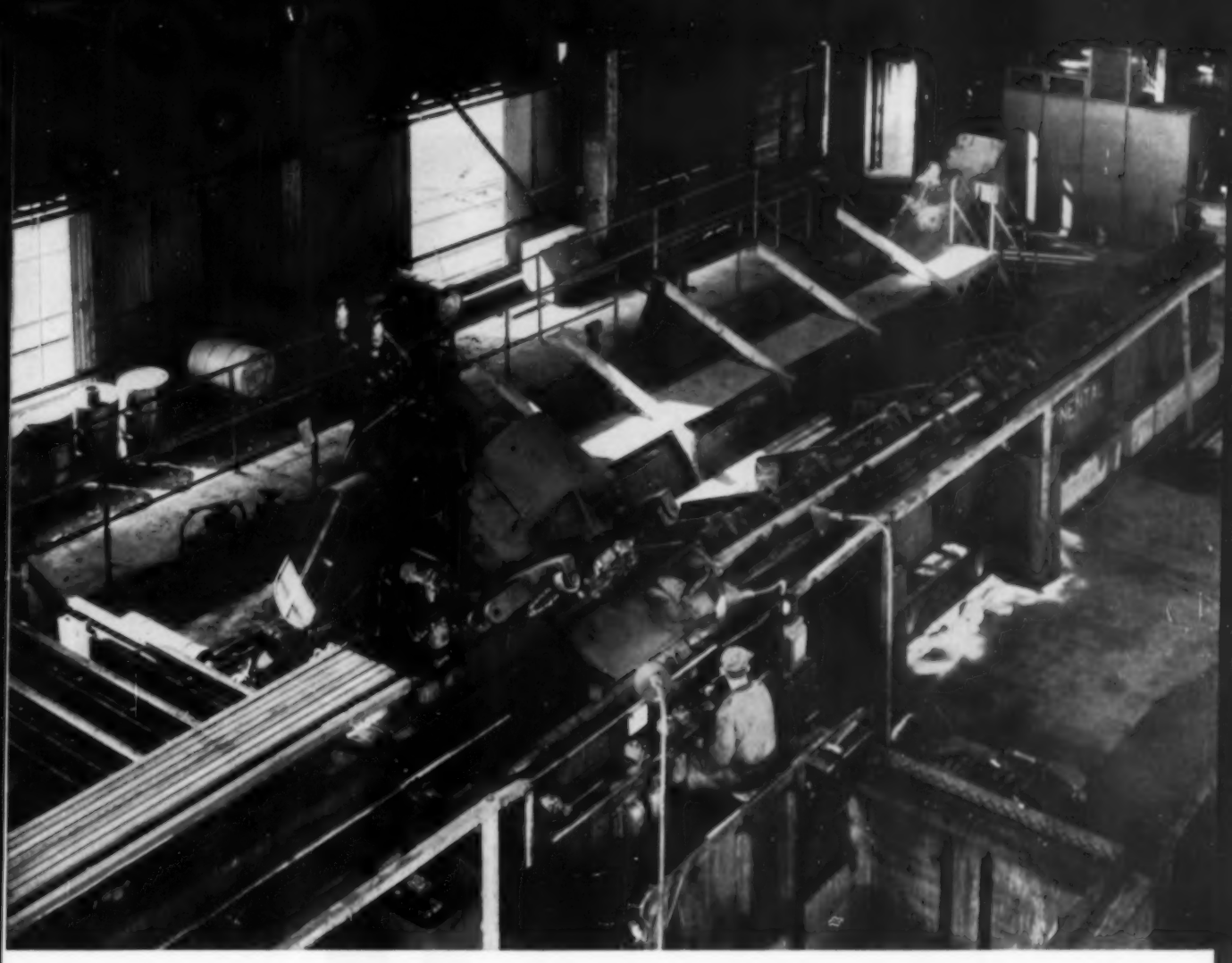
Weighted Guess

A crafty looking fellow came in here one day last week, and spoiled our whole day. "If you owned 52,363,000 tons of the world," he beamed, carefully licking his lemon lollipop, "would you have a foot, an acre, a section or a mile?"

We came up with reams of figures until the man with the butterfly net came after us. Maybe you clever people out there with your nimble slide rules can tilt at this one. The measurements, of course, suggest inverted pyramids.

Shrdlu

(Metalworking Outlook—Page 27)



BLAW-KNOX makes what it takes

for continuous, mechanical chipping

The Continental Chipper with auxiliary equipment is a complete mechanical system for sorting, handling, inspecting and chipping billets. This integrated system has demonstrated in-service cost savings over manual conditioning. It represents a wise investment in long range modernization programs for conditioning for subsequent rolling in merchant and bar mill operations.

Product quality improvement is immediate, positive. Precise chipping is accomplished by a non-traveling cutter head under which the billet moves in a fashion similar to a milling machine. All chipping is done at close range, immediately in front of the operator. This single operator, located in front of the cutter head controls the entire operation including all material handling.

The chipper is equipped with special interlocking devices which eliminate unsafe operation. Usual chipping bay hazards such as high pressure air lines, improperly handled chisels, and flying chips are removed. The Continental Chipper accommodates billets up to 30 feet in all merchant and bar mill sizes.

For complete details, write for illustrated booklet.

50th Anniversary
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1906-1956

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Foundry and Mill Machinery Division
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NEW "Unionmelt" Welding Assemblies

for greater job versatility- performance dependability

Versatility and dependability are yours at an all time high in an improved new line of UNIONMELT welding assemblies . . . These units embody the greatest variety of machine combinations, job applications, and design features ever offered for submerged arc welding.

Wire feed units are simply constructed and are highly efficient . . . Identical mounting dimensions for heads, brackets, and slides allow for any number of desired assembly combinations.

Welding heads have exceptional flexibility because of sturdy new mounting fixtures which provide for vertical, horizontal, and rotary adjustment. Stationary and self-propelled combinations are also available.

The wide variety of standard and custom UNIONMELT welding assemblies can easily be made to fit your particular applications—at costs lower than many current standard models.

See your local LINDE *representative today for information on the many other new features—or write for free illustrated literature.*

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Sun's Heavy Duty Emulsifying Cutting Oil excels on high-alloy aircraft steels

S.E.C.O. Heavy Duty handles all machining jobs requiring an emulsifying cutting oil. Piasecki Helicopter's large job shop at Morton, Pa., found this out three years ago when S.E.C.O. HD* replaced two expensive heavy-duty soluble oils in machining fan hubs.

Extremely versatile and moderately priced, S.E.C.O. HD has been doing an exceptional job in cutting a variety of high-alloy aircraft steels for Piasecki.

For more information about S.E.C.O. HD, see your Sun representative. Or write to SUN OIL COMPANY, Philadelphia 3, Pa., Dept. S-7.

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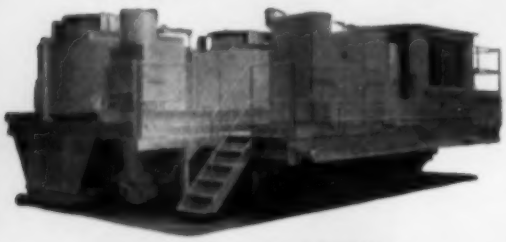
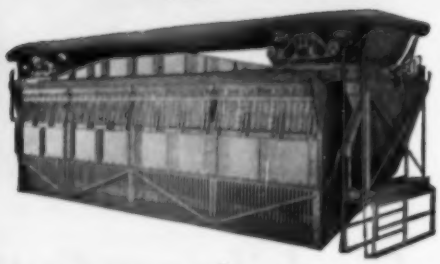
Making coke is a specialized business, and requires special equipment like the cars below. Coke plant operators prefer Atlas Cars because they are dependable.

3 HOPPER COAL CHARGING CAR



COKE QUENCHER



HYDRAULIC DOOR MACHINE

40-TON COKE TRANSFER CAR

THE ATLAS CAR & MFG. CO.

ENGINEERS MANUFACTURERS

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LETTERS
TO THE EDITORS

Company Seeks More Reprints

You supplied us with three copies of an article, "More Work for Water" (Jan. 30, page 84), which we consider helpful.

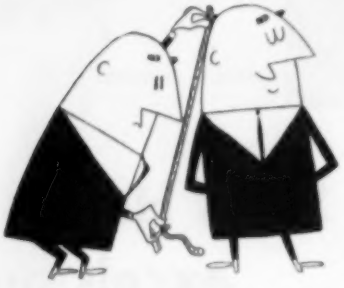
Can we obtain 1000 reprints for distribution to engineers and other personnel throughout the western part of New York and Pennsylvania and the eastern part of Ohio?

From time to time, we notice items which are educational and helpful, and we would frequently like to secure reprints for distribution in our area. What is the procedure for use of reprints on this large a scale?

Robert W. Kirchhoff
Engineering Associates
Division of Trymac Inc.
Erie, Pa.

• *Each article is individually handled for reprinting in quantities of over 100. Send requests for cost quotations and layout suggestions to June Schilens, STEEL Reprint Department, Penton Bldg., Cleveland 13, O.*

Designing Need: Measure Man



Please mail to my attention an extra copy of the article, "Design with Man in Mind" (June 18, page 148).

H. L. Haeberle
Purchasing Agent
Armstrong Products Corp.
Huntington, W. Va.

We would appreciate tear sheets of this article.

Morton S. Titleman
Project Engineer
Industrial Engineering Dept.
Dominion Bridge Co. Ltd.
Montreal, Que.

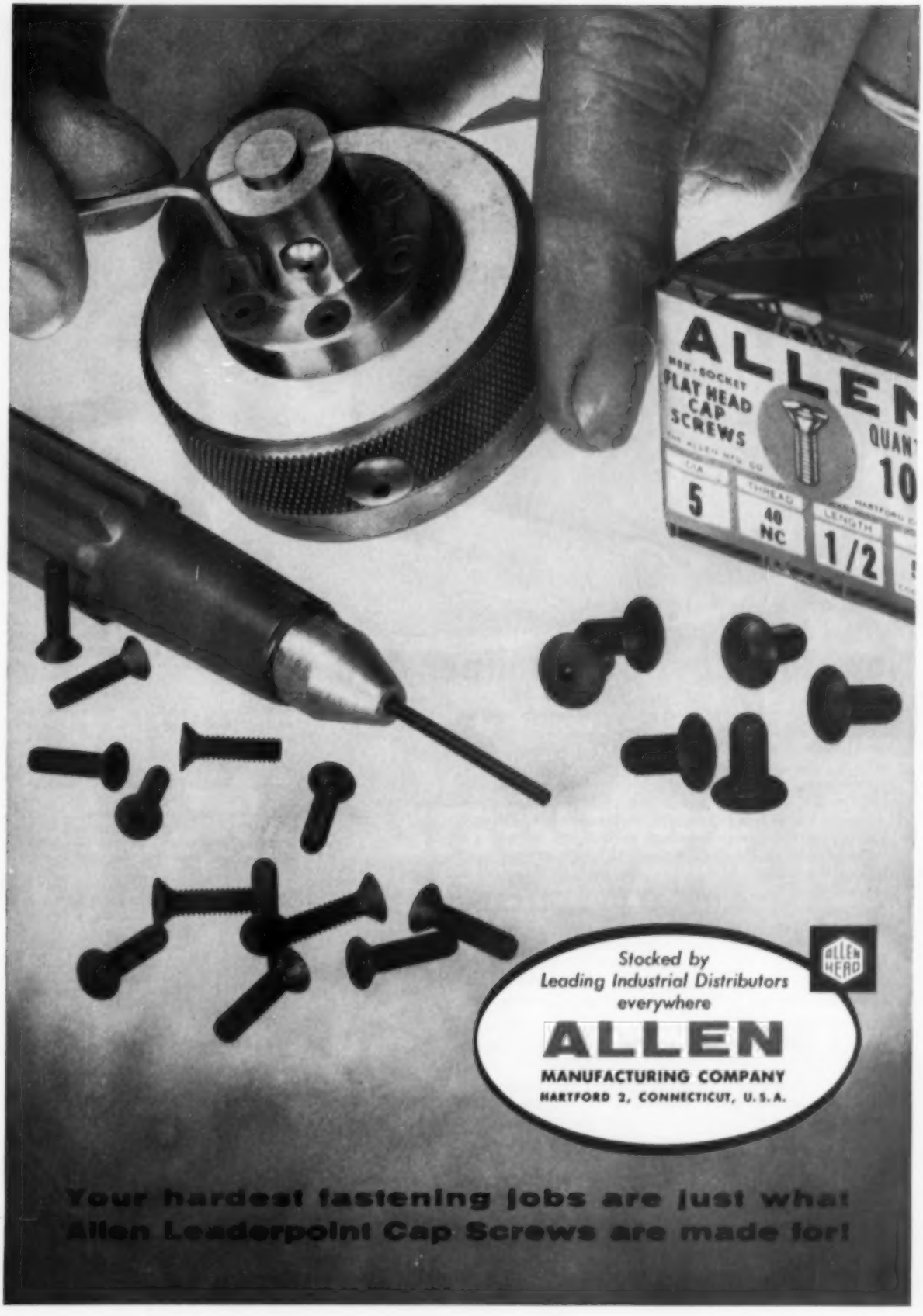
Inventory Change Calculation

We read with interest the article, "Auto Men Stock Up" (Apr. 30, page 59). What is the method used to calculate the inventory change in the chart ("Steel Inventories Rise")?

Norman Lawson
Assistant Manager
Market Research Dept.
Colorado Fuel & Iron Corp.
Denver

• *We calculated that steel consumption and steel shipments were equal in June, 1953. Using that month as a base period, we divided the Federal Reserve Board's*

(Please turn to page 12)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Prints and develops at speeds up to 24 feet per minute . . . handles prints up to 42 inches wide. High-intensity mercury vapor lamp provides complete, uniform exposure. Patented evaporator and thermostatically controlled heater rod assure uniform print development.

Synchronized printing and developing sections permit continuous operation with roll stock. Short travel provides rapid processing of cut sheets. Automatic controls regulate temperature and ammonia flow. New electronic drive provides instantaneous speed changes with complete accuracy—simple enough for the novice operator!

Smartly styled, compact, the Streamliner 400 stands just 49″ high, 63″ wide, and 31″ deep, and is finished in durable, ripple-gray baked enamel. One-piece enclosed base, welded-steel body and tubular support assure exceptional rigidity and permanent alignment.

INSTANT COLOR CHANGE—You change print color instantly, simply by using different Ozalid papers. No messy fluid changes or time-consuming clean-up required on any Ozalid model.

Ask your nearest Ozalid distributor to demonstrate the low-cost, high-volume Streamliner 400. His number's in the phone book, or write Ozalid, Dept. P-7, Johnson City, N.Y., for descriptive brochure.

LOOK FOR IT!

Got A Printmaking Problem?
Call your local Ozalid representative. His expert advice is yours for the asking—whether or not you now own or plan to buy Ozalid equipment.

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DIRECT COPY SYSTEMS

A Division of General Aniline and Film Corporation
In Canada: Hughes Owens Co., Ltd., Montreal

LETTERS

(Concluded from page 10)

seasonally adjusted metal fabricating index into the American Iron & Steel Institute's figures on mill shipments of finished steel. This resulted in the factor, 41,370, which we figure is equal to each point in the FRB index.

By multiplying 41,370 by the current index number, we have a figure for consumption of finished steel.

If the result is smaller than mill shipments of finished steel for that month, the difference is the amount going into inventory. If it is larger, the difference is the amount by which inventory was reduced.

Looking for New Horizons

The articles on missiles, "Metalworking's New Horizons" (June 18, page 137) and "Heat Treating Superstrength Steels" (June 18, page 150), were exceptionally interesting, informative and well written.

I believe your magazine could be a tremendously beneficial factor in the over-all missile program by publishing more articles like the above.

More talent, tools and time will be required to get our lunar ships with atomic engines successfully launched, even though thousands of large and small manufacturers are already working in this fascinating new and highly technical industry. We are now spending millions and will be spending billions.

With more factual information, our present complicated problem of changing fiction to fact will be simplified.

I would appreciate three copies of each of these articles.

L. F. Megow
General Manager
Fabrication Steel Division
Hahn & Clay Machine & Boiler Works
Houston

Wage Information Sought

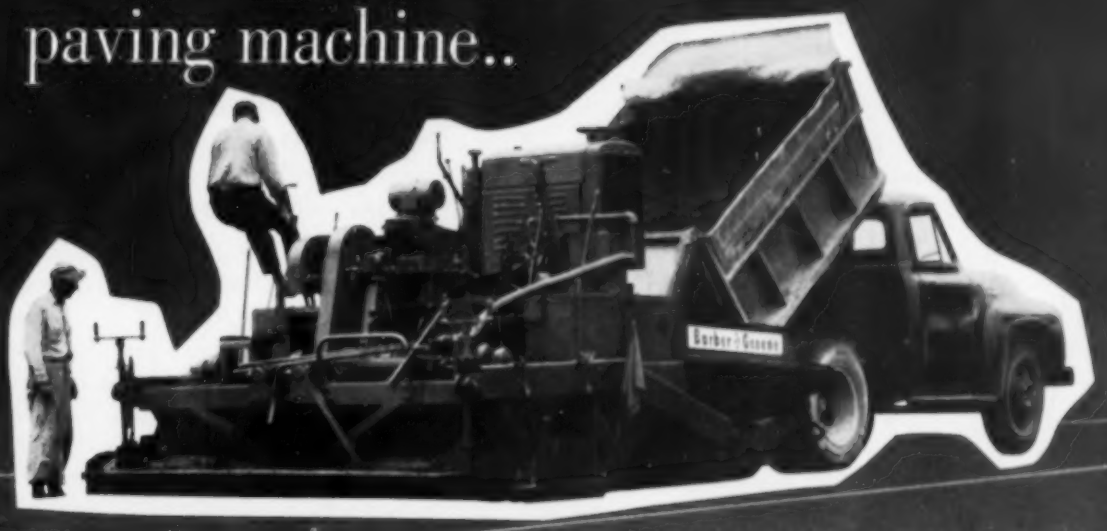
Can you give us the most recent figures on the high, low and average percentage of overhead to direct labor of the cold-rolling steel fabricators in the U. S.?

Otto E. Kraus
Mailman Bros.
New York

• *We suggest you contact the American Iron & Steel Institute, 150 E. 42nd St., New York 17, N. Y. At various times it has published "Background Memos on Wage Trends in the Iron and Steel Industry." In April, it issued a four-page folder, "Wage Trends in the Iron and Steel Industry."*

.. for strength
.. for accuracy

16 important operating PARTS of this Barber-Greene paving machine..



.. are made of ground and polished

La Salle STRESSPROOF®
SEVERELY COLD-WORKED, FURNACE-TREATED
STEEL BARS

This dependable Barber-Greene paving machine uses 16 separate parts, all made of quality ground and polished STRESSPROOF steel bars.

Why STRESSPROOF? It has the needed strength, without heat treating . . the accuracy of the ground and polished finish . . plus excellent machining.

STRESSPROOF makes a better part at lower cost.

If you make parts requiring ground and polished accuracies or finish, plus these in-the-bar qualities . . (1) High Strength, without heat treating, double that of ordinary cold-finished shafting, (2) Machinability, fully 50% better than heat treated alloys of the same strength, (3) Wearability, without case hardening and (4) Minimum Warpage . . then STRESSPROOF offers you definite advantages. Write or call for further information.

La Salle manufactures America's most complete line of quality cold-finished steel bars.

Ask for your copy of helpful data bulletin No. 15 "Improve Quality . . Cut Costs"

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1414 150th Street, Hammond, Indiana

Please send, "Improve Quality . . Cut Costs" booklet.

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title_____

company_____

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city_____ zone____ state_____

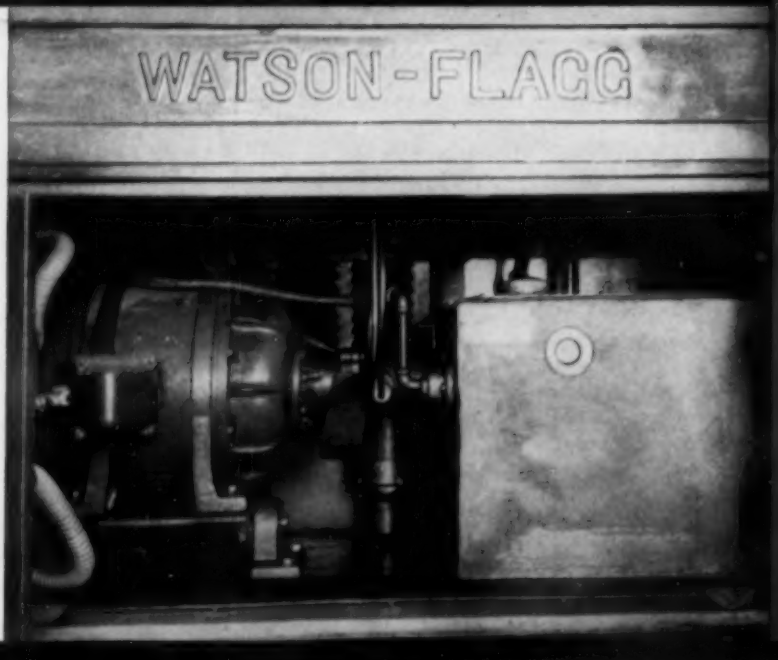
STANOIL *Industrial Oil delivers on tough assignment at Indianapolis Screw Products Corp.*

Rolling threads on aluminum bronze with pitch diameter tolerances as close as .0014" is a tough job but Indianapolis Screw Products Corporation is used to taking on such jobs and delivering. They give tough jobs to the hydraulic oil they use, too, and they expect it to deliver. They've given such a job to STANOIL and they're getting the results they expect—and more.

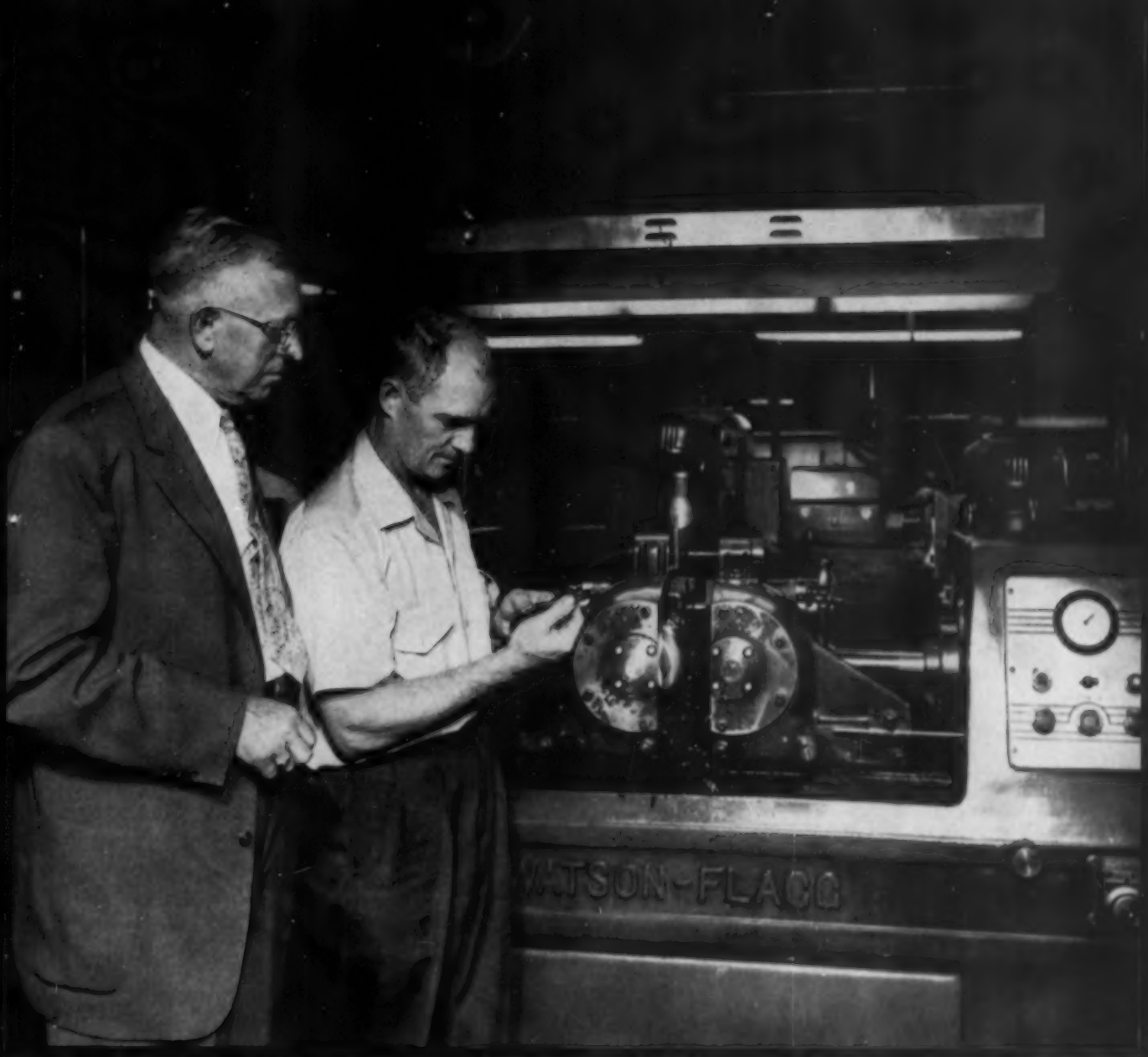
STANOIL Industrial Oil is used in the hydraulic system of a Watson-Flagg precision thread roller in the Indianapolis Screw Products Corporation plant. The system uses a Vickers pump and Cuno filter. The filter has not been cleaned in over a year *because it hasn't needed cleaning.* Here, as in other applications, STANOIL delivers top performance with minimum maintenance and maximum system cleanliness.

STANOIL likes tough assignments like this one; likes them because it can deliver with plenty to spare.

Perhaps you would like to know about the use of STANOIL in a hydraulic application in your plant. In the Midwest and Rocky Mountain states, a lubrication specialist at your nearby Standard Oil office will be happy to discuss it with you. Call him. Or, if you would like, contact Standard Oil Company, 910 South Michigan Avenue, Chicago 80, Illinois.



Tight gaskets, good maintenance, and STANOIL add up to first rate performance at Indianapolis Screw Products Corporation. This shot of Vickers pump shows how good housekeeping and STANOIL team for top operation on tough assignment.



Cuno filter in Watson-Flagg Thread Roll machine has filtered STANOIL more than a year. Filter remains clean.

Mr. R. W. Williams, Plant Superintendent, checks pitch diameter of thread with Glenn Riggs, Standard lubrication specialist. Glenn Riggs is an old hand at helping industrial firms work out lubrication problems. Glenn has been doing this sort of thing for 28 of the 30 years he's been with Standard. This background and experience, customers have found, pay off for them.

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(Indiana)

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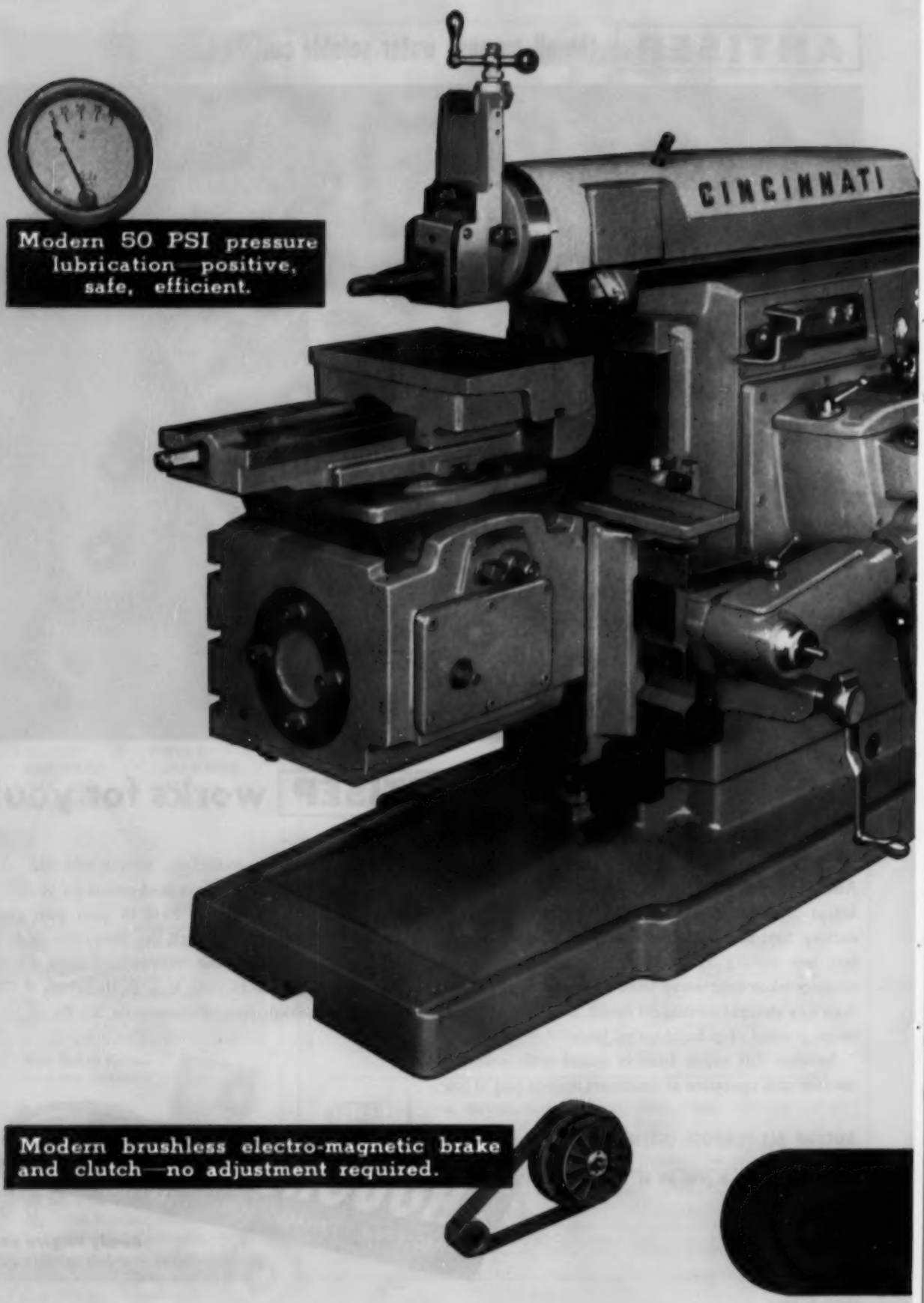
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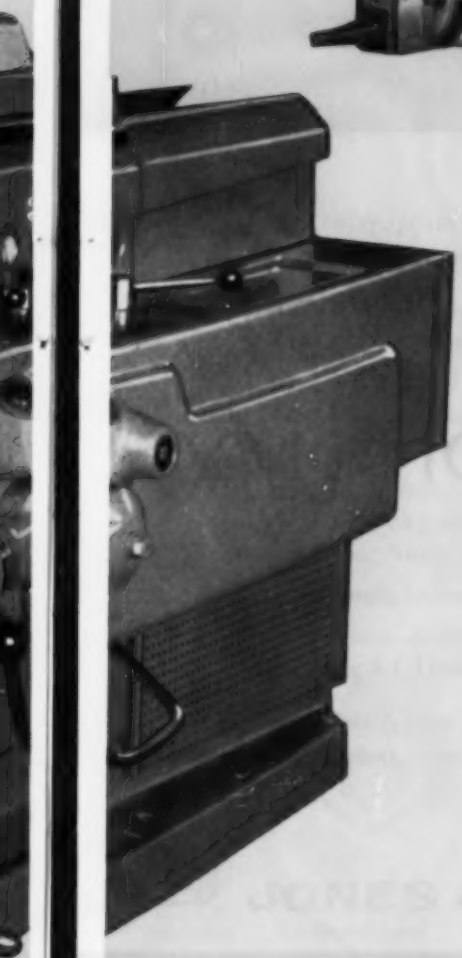

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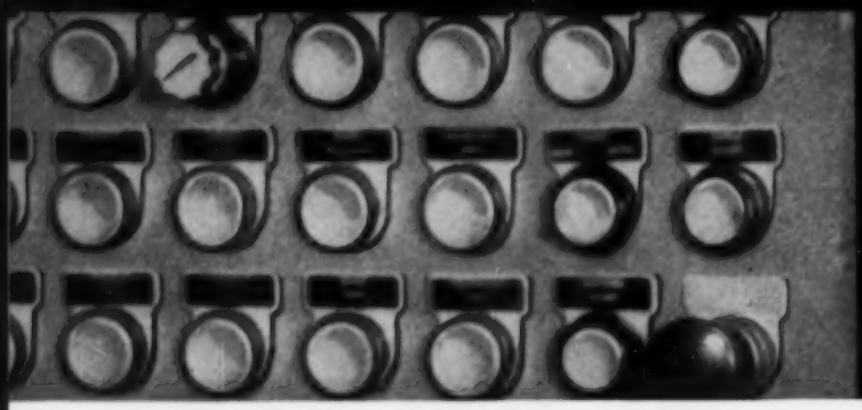

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Today, advanced engineering at Jones & Lamson again pioneers in attacking a critical cost consideration: the *man-hour* factor.

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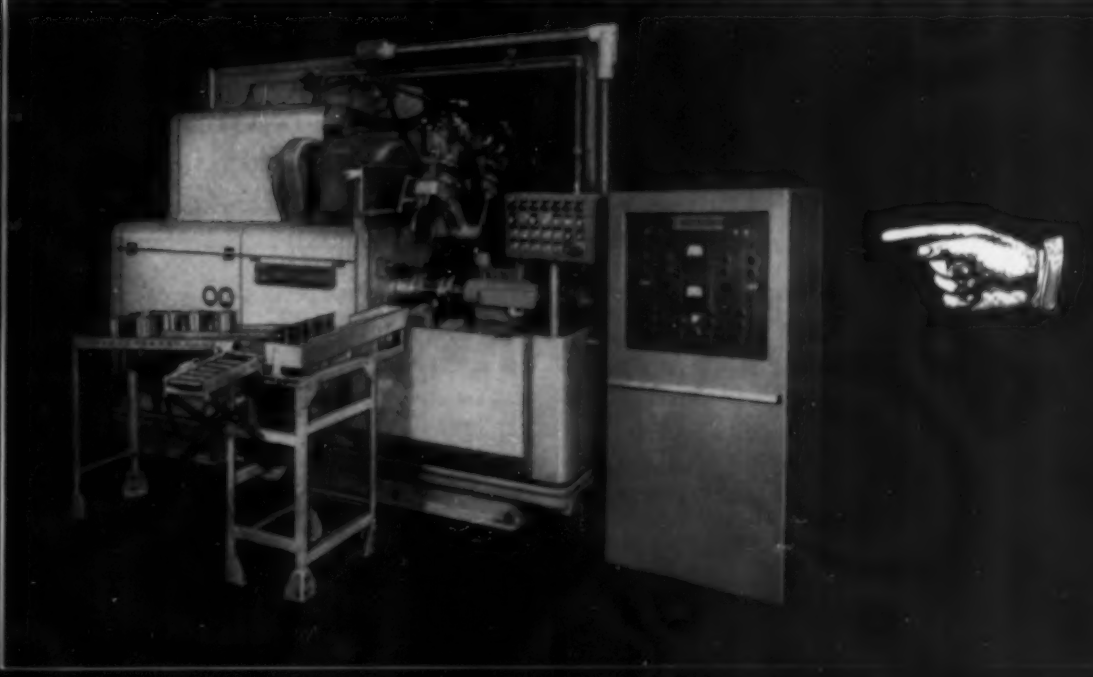

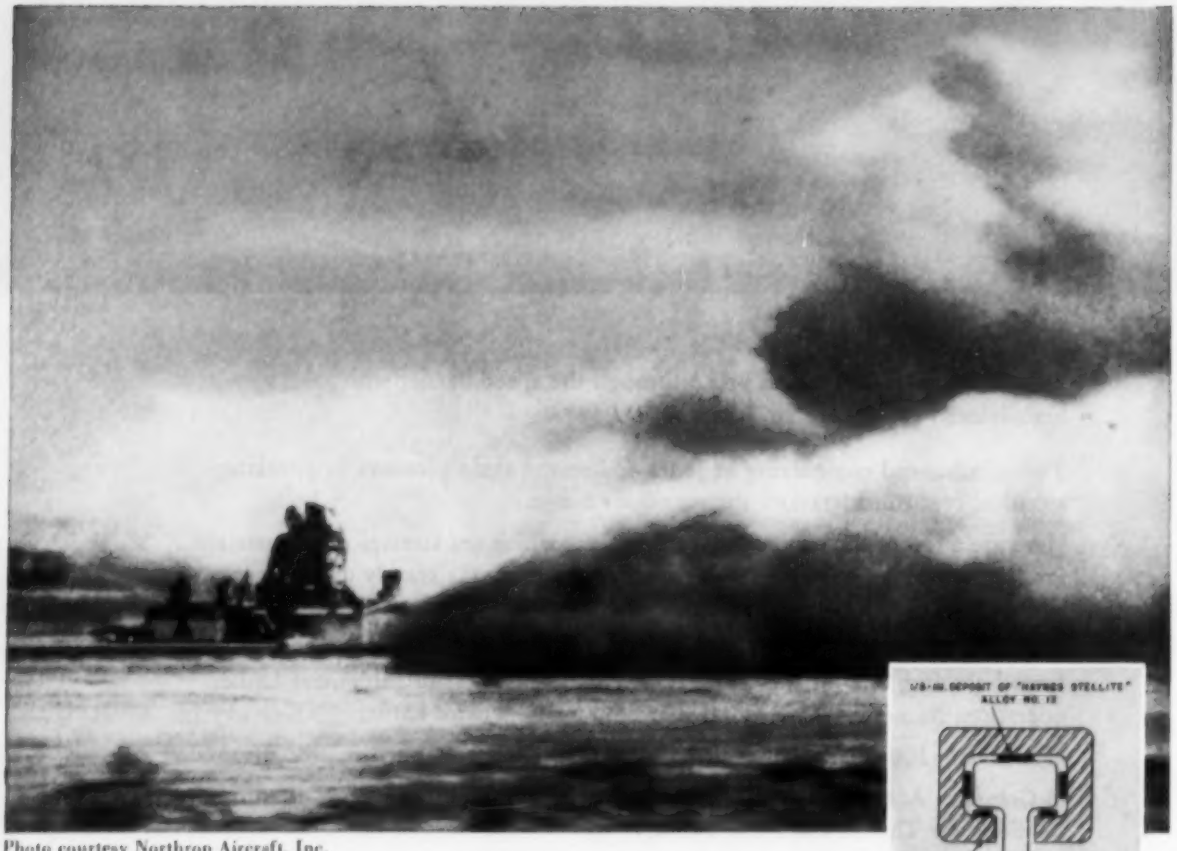

Photo courtesy Northrop Aircraft, Inc.

Rocket Sled Rides at Supersonic Speeds on Hard-Faced Slippers

Four hard-faced slippers bear the entire weight of this rocket-propelled sled as it hurtles down a special railway at more than 900 miles per hour. Hard-facing protects the slippers from abrasion and the tremendous frictional heat generated during each run, and enables them to make 12 trips. Before hard-facing was adopted, the slippers wore rapidly and often had to be replaced after every trip.

As the sketch (above) shows, each slipper is hard-faced at five locations with HAYNES STELLITE alloy No. 12 rod. The cobalt-base alloy is deposited by the metallic-arc method and then finished by machining.

The successful use of HAYNES STELLITE rod on the rocket sled slippers emphasizes several outstanding characteristics of this cobalt-base material. It has exceptional resistance to metal-to-metal wear and frictional heat. It retains its hardness even when exposed to temperatures in the red heat range. In addition, it will withstand the effects of corrosion, erosion, and oxidation, and it has a low coefficient of friction. This combination of properties makes it extremely valuable for protecting such industrial parts as valves, valve seats, bushings, pump shaft sleeves, mandrels, extrusion screws, punches, and dies.

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CALENDAR
OF MEETINGS

July 18-28, Truck-Trailer Manufacturers Association Inc.: Summer meeting, Edgewater Beach hotel, Chicago. Association's address: 710 Albee Bldg., Washington 5, D. C. Managing director: John B. Hulse.

July 23-28, National Tool & Die Manufacturers Association: Summer meeting, Stanley hotel, Estes Park, Colo. Association's address: 907 Public Square Bldg., Cleveland 13, O. Executive secretary: George S. Eaton.

Aug. 6-8, Society of Automotive Engineers Inc.: National west coast meeting, Mark Hopkins hotel, San Francisco. Society's address: 29 W. 39th St., New York 18, N. Y. Secretary: John A. C. Warner.

Aug. 7-8, National Screw Machine Products Association: National sales conference, Wade Park Manor hotel, Cleveland. Association's address: 2860 E. 130th St., Cleveland 20, O. Executive vice president: Orrin B. Wernts.

Aug. 21-24, Western Electronic Show and Convention: Pan Pacific Auditorium and Ambassador hotel, Los Angeles. Information: WESCON, 344 N. LaBrea Ave., Los Angeles 36, Calif.

Sept. 7-9, Metal Powder Association: Fall meeting, Homestead, Hot Springs, Va. Association's address: 420 Lexington Ave., New York 17, N. Y. Secretary: Robert L. Ziegfeld.

Sept. 9-12, American Institute of Chemical Engineers: Fall meeting, William Penn hotel, Pittsburgh. Institute's address: 120 E. 41st St., New York 17, N. Y. Secretary: F. J. Van Antwerpen.

Sept. 9-12, National Metal Trades Association: Eastern plant management conference, Essex-Sussex hotel, Spring Lake, N. J. Association's address: 122 S. Michigan Ave., Chicago 3, Ill. Secretary: Charles L. Blatchford.

Sept. 10-12, Allied Railway Supply Association: Annual meeting, Sherman hotel, Chicago. Association's address: 1200 W. Chase Ave., Chicago 26, Ill. Executive secretary: Charles F. Weil.

Sept. 10-12, Packaging Institute: Annual forum, Hotel Statler, Cleveland. Institute's address: 342 Madison Ave., New York 17, N. Y. Executive director: Charles A. Feld.

Sept. 10-13, Society of Automotive Engineers Inc.: National tractor meeting and production forum, Hotel Schroeder, Milwaukee. Society's address: 29 W. 39th St., New York 18, N. Y. Secretary: John A. C. Warner.

Sept. 11-13, American Die Casting Institute: Annual meeting, Edgewater Beach hotel, Chicago. Institute's address: 366 Madison Ave., New York 17, N. Y. Secretary: David Laine.

Sept. 11-14, Packaging Machinery Manufacturers Institute: Packaging machinery and materials exposition, Public Auditorium, Cleveland. Information: Hanson & Shea Inc.: One Gateway Center, Pittsburgh 22, Pa.

Sept. 13-14, Porcelain Enamel Institute: Annual meeting, Broadmoor hotel, Colorado Springs, Colo. Institute's address: 1145 19th St. N. W., Washington 6, D. C. Secretary: John C. Oliver.

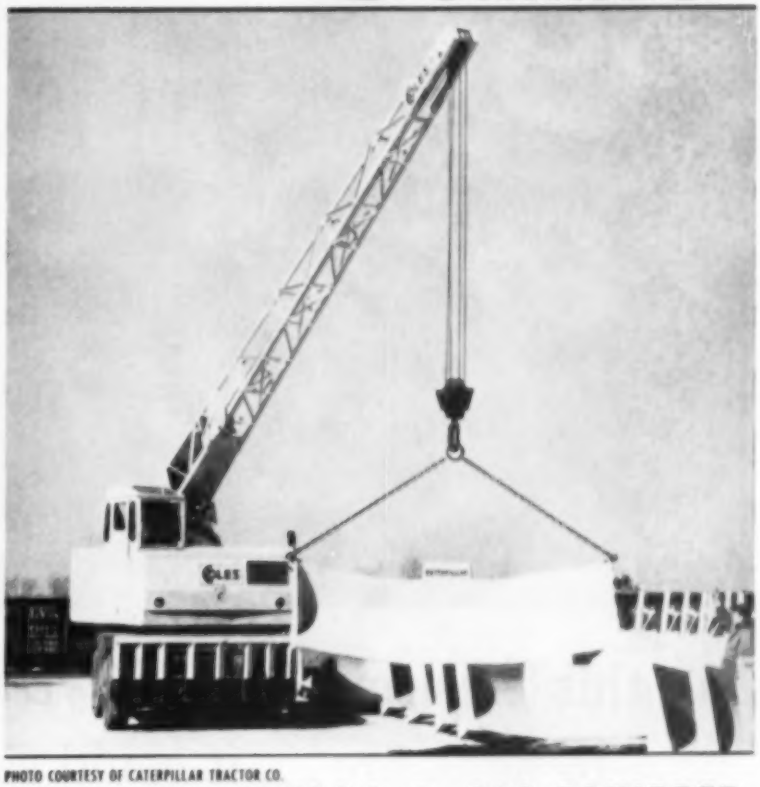
Sept. 16-20, American Society of Sanitary Engineering: Annual meeting, Morrison hotel, Chicago. Society's address: 4716 Ewing Ave. S., Minneapolis. Secretary: Walter A. Dunn.

Sept. 16-21, American Chemical Society: Annual meeting, Convention Hall, Atlantic City, N. J. Society's address: 1155 16th St. N. W., Washington 6, D. C. Executive secretary: Alden H. Emery.

Sept. 16-22, American Society for Testing Materials: Pacific area national meeting and apparatus exhibit, Hotel Statler, Los Angeles. Society's address: 1916 Race St., Philadelphia 3, Pa. Executive secretary: Robert J. Painter.

Cut costs 101 ways*

COLES CRANES



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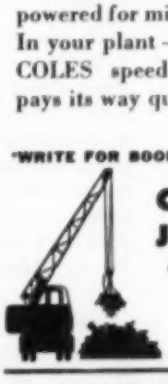

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You owe it to the life of your business to learn more about Ansul's in-plant fire training service. Get in touch with your local ANSUL MAN through the yellow pages of your phone directory, he will be happy to call on you and explain all of Ansul's customer services in detail. Or write to THE ANSUL CHEMICAL COMPANY, Dept. S - 7, Marinette, Wisconsin.

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for Colonial Steel Division

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"Besides eliminating repair costs during the four years we have operated the Torqomotive, we have spent an average of only six hours a month for routine maintenance. Starts and stops—and we have plenty of them—are much smoother now, and our operators like the ease with which they can switch and spot the cars."

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Write today for a free catalog giving details and performance data. PLYMOUTH LOCOMOTIVE WORKS, Division of THE FATE-ROOT-HEATH COMPANY, Dept. A-1, Plymouth, Ohio.

PLYMOUTH® TORQOMOTIVES

*TORQOMOTIVE DRIVE: Plymouth Transmission coupled to a Hydraulic Torque-Converter

ALSO BUILDERS OF F-R-H CERAMIC MACHINERY

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AMERICAN WELDING

STEEL

July 2, 1956

Metalworking Outlook

Situation in Steel Prices

Steelmaking costs immediately go up about 40 cents for every penny in higher wage costs. But that does not count the higher expense of goods and services purchased that comes along some time after basic steel boosts. Here are average steel price increases that have come in recent years: $7.35 in 1955 (after a 15-cent wage grant); $3 in 1954; $4 in 1953; $5 in 1952; $5.50 in 1950; $4 in 1949; and $8 in 1948 (after a 13-cent pay hike).

Auto Prospects Improve

Look for no further major auto layoffs until the switchover to 1957 models, scheduled in October and November. Packard stopped production on 1956s last week (see page 48), but other makers, including Studebaker, expect to continue 1956 assemblies for some months. Dealer inventories are estimated at about 750,000, compared with the record of more than 903,000 units last Mar. 1.

Trigger Contracts Let

More than half the government's machine tool "trigger" contracts are on their way to participating builders. The contracts have been cleared through the Defense and Commerce departments and the Office of Defense Mobilization. The remainder will be on the way soon.

Nickel Alloy Controls Begin

U.S. controls on the use of nickel alloys are in effect. Users will have to mark defense rated orders and producers will have to give them preferential treatment on mill schedules. No set-asides have been arranged and probably won't be until a few months' experience is had with the system. When ordering nickel to make alloys for defense orders, producers will have to deduct from their gross requirements the amount of nickel contained in plant generated scrap.

Nickel Scrap Exports Tightened

The Commerce department's Bureau of Foreign Commerce is taking tougher control measures against exports of nickel bearing scrap. The policy: Exports of all such scrap generally will not be approved in the third quarter. Formerly, export limitations applied only to certain kinds of nickel bearing scrap.

Coming: Action on Metals

Watch for revised expansion goals and upward revision of stockpile requirements for molybdenum, cobalt, columbium-tantalum, tungsten and probably titanium. The reason: They all have high-temperature applications in aircraft. The Defense department is working on estimates of how

Technical Outlook—p. 65 Market Outlook—p. 97

much it may need. The Office of Defense Mobilization is working with the Pentagon.

Sources for Power

The Atomic Energy Commission estimates that by the year 2000 only about 1 per cent of the electricity generated in the U.S. will come from oil and natural gas fuels, compared with 50 per cent today. The atom, coal and water will be the major power makers by the turn of the century. Growing tonnages of coal are consumed by the atomic energy program itself—some 20 million tons a year now and an estimated 40 million tons annually within five years.

Boom in Optical Grinders

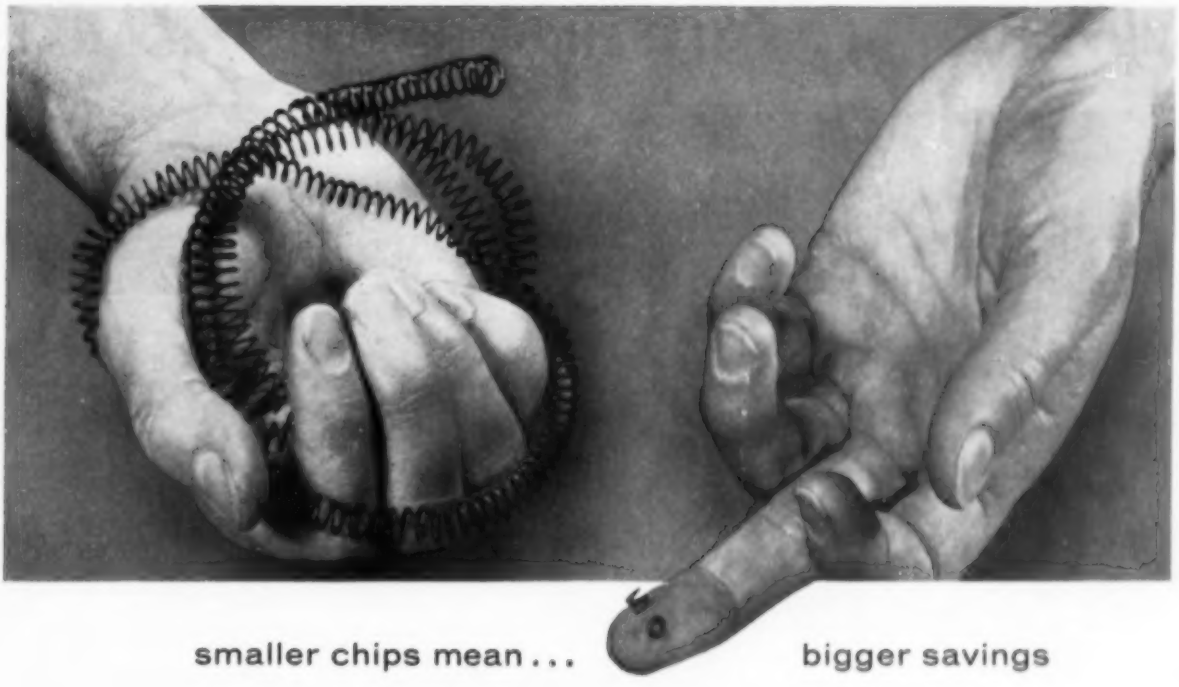
Optical grinding machines are experiencing a terrific upsurge in popularity, according to a survey of some half-dozen manufacturers. In 1952, the six companies reported sales of about $150,000. Last year, their volume had soared to $5 million. For the machine tool industry as a whole, sales dropped 40 per cent between those two years, from $1.1 billion to $660 million. This year, while optical grinding machines probably have found their niche in the machine tool economy, the makers still expect to do slightly better than the industry's average. They estimate their sales this year at $7 million, up 40 per cent from 1955's. Outlook for the industry (see page 33) is for a 36 per cent gain.

New Status for Maintenance

Maintenance engineers are assuming major roles in decisions for the purchase of plant equipment, according to a study by Clapp & Poliak Inc., exposition management firm which produces the Plant Maintenance & Engineering Show. Sixty-six per cent of those interviewed play a major part in the purchase of new capital equipment, and 79 per cent reported that maintenance executives sway decisions on what brand is to be purchased. Asked whether the influence of maintenance executives on purchasing is increasing or waning, 78 per cent reported that it was on the way up; 22 per cent said it was about the same; none reported a decrease. "Capital equipment manufacturers must widen their sales approach to the plant operating team to include this new, important purchasing factor," the report states.

Straws in the Wind

General Electric Co. has renamed Carboloy Department its Metallurgical Products Department, to reflect the company's greater emphasis on the development of specialty metals and their manufacture . . . Stockholders of York Corp. approved merger of the air conditioning equipment firm with Borg-Warner Corp. . . . Chrysler Corp. does business with nearly 12,000 suppliers in 44 states . . . Stock market fluctuations during 1955 left unchanged the major investment pattern of private pension and profit-sharing trusts, says Commerce Clearing House.



smaller chips mean . . . bigger savings

Cut costs with RYCUT steels!

Three new Ryerson leaded alloys

These short, fast-breaking chips have real meaning to cost-conscious purchasing and production men. In an ever-increasing number of shops, small chips like these mean that the switch has been made to Rycut steels. They mean that tools are turning faster—that production is up as much as 200%.

The secret of Rycut's machining speed is a minute quantity of lead, finely dispersed throughout the steel. This acts as a lubricant between tool and steel. The results are revolutionizing machine shop practice:

- Up to 200% more parts can be produced per machine hour!
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- Finish is improved!

There's a Rycut leaded alloy for every application. Use RYCUT 20 when you need a carburizing alloy; RYCUT 40 for .40 carbon alloy applications; and RYCUT 50 for .50 carbon alloy uses. Every one is a cost-cutter.

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NOW LEADED PLATES— Ryerson's New E-Z-Cut is the first leaded plate steel available from stock. It cuts faster, polishes easier than other free-machining plate steel.

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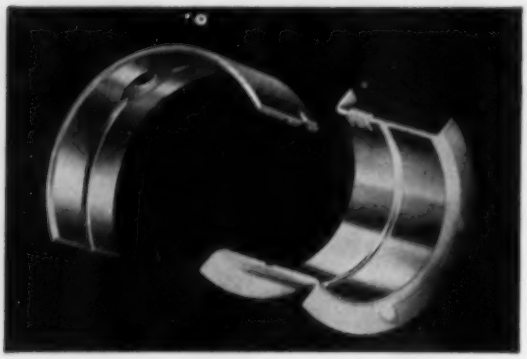
The PROOF of the STEEL is in its PERFORMANCE



DSC CLOSE-GAUGE STRIP is used in these precision sleeve and ring type bearings for car, truck, marine, industrial, farm tractor and certain aircraft engines.

When Your Blue Print Specifies CLOSE-GAUGE Try DSC STRIP for Size . . .

with job-suited finish and temper for good measure

For most stamped and roll-formed products, the standard thickness tolerance of DSC STRIP is close enough.

For example—in the most popular gauge range, say from .015" to .099"—the tolerances are from ± .0015" to ± .0035" tops, even in maximum widths and heavier gauges.

But when your blueprint specifies "specially restricted" thickness tolerance—you can, if need be, get DSC STRIP as close as ± .0005" *including crown* in gauges up to .187". In DSC STRIP rolled for certain sleeve and ring type bearings, the "amount of gauge restriction" is as much as 86.6% closer-than-standard.

For example—5.5" x .09235"/.09245": ordered overall tolerance is .001" against standard overall .0075" for this gauge and width.

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- Automatic transmissions
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For Labor Statesmanship

During the wage discussions between the United Steelworkers of America and the eleven major steel companies over the last four weeks, one fact stood out:

Negotiations which rival trade pacts between great nations in importance call for higher standards of statesmanship.

From the conference rooms in New York came statements that often were distorted, or in terms that were not comparable, or were not understandable. Points such as these could have been clarified:

That total employment costs (including fringes and payroll tax costs) are not the same as take-home pay or net wages.

That steelworkers already are among the highest paid in industry (53 cents an hour more than in all manufacturing).

That steel companies can work out a common defense on the labor front without conspiring illegally. Otherwise, there is no defense against the union strategy of singling out one company at a time and forcing it into submission.

That excessive overtime pay for week-end work (or a five-day week) could bring about a revolution in steelmaking.

That the production of 111 tons of ingots per steelworker in 1955 for every 100 in 1954 is not an 11 per cent increase in productivity. Steelworkers were not laid off in proportion to the drop in steel demand in 1954.

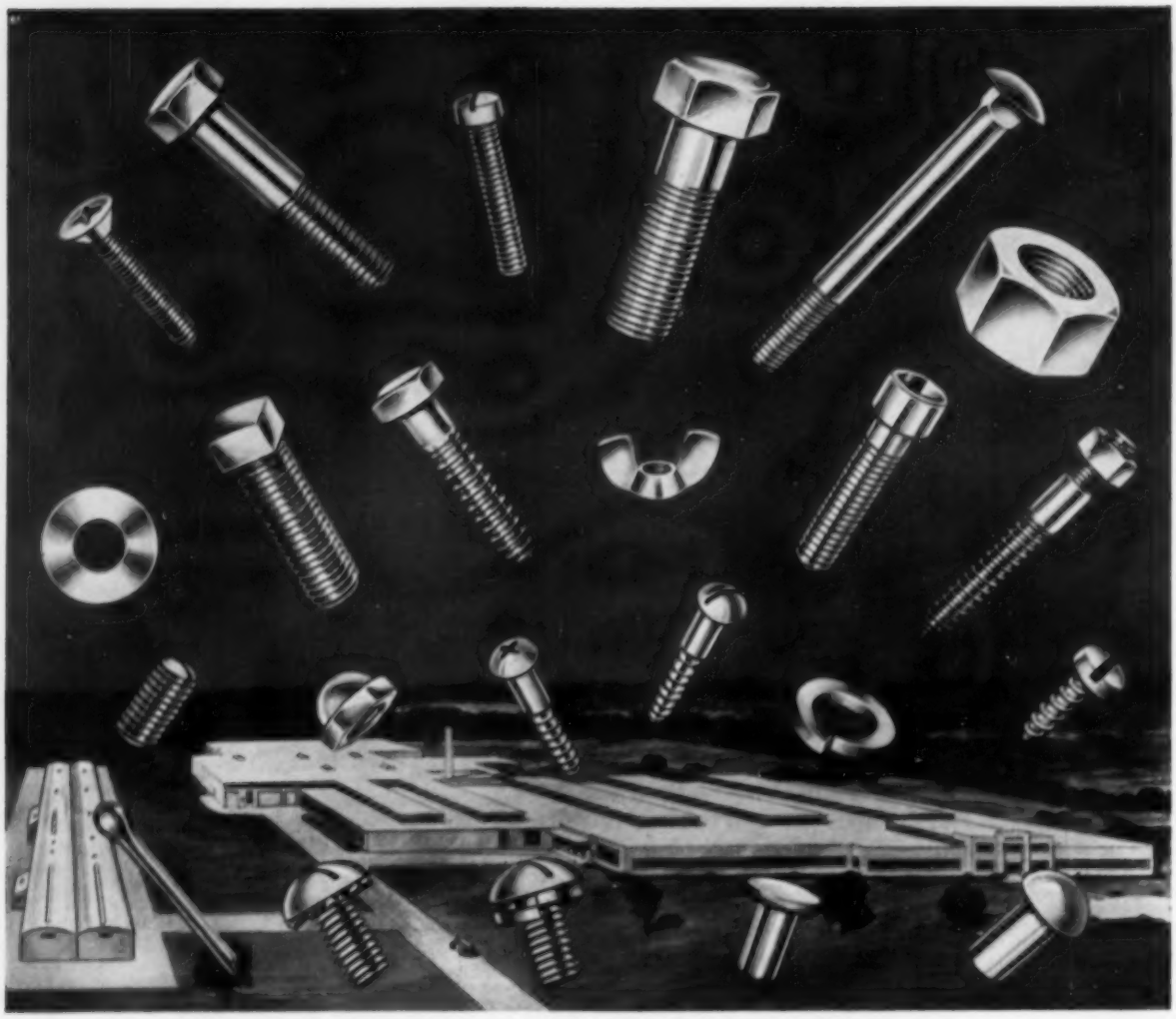
Even before negotiations started, fear of a shutdown prompted consumers of steel to build up inventories to give them some assurance that they could continue operations. Fear of losing their jobs prompted steelworkers to curtail expenditures for things they needed, with devastating effects on local trading areas.

Such fears were inspired by the realization that the steelworkers' union, with 1.2 million members, has become a powerful monopoly in basic steel and in nearly 1500 companies—a large segment of the metalworking industry. The union could close down the eleven major steel companies, which account for 94 million tons of ingot capacity and supply nearly 75 per cent of the nation's steel requirements, and most other steel plants.

While labor and management are dealing with each other on a much higher plane, there is much room for improvement. What is needed is greater statesmanship.

Irwin H. Such

EDITOR-IN-CHIEF



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Machine Tool Shipments

(Millions of dollars, cutting types only)

Jan.	54.6
Feb.	64.6
Mar.	74.1
Apr.	71.8
May	76.8
Annual rate so far this year	820
Unofficial goal for year	900

Goal estimated by STEEL
Other figures: National Machine Tool Builders' Association

Warner & Swasey Co.

Machine Tool Shipments Lag

But builders are hoping to turn on the heat after vacation slowdowns in July and August. More overtime and subcontracting will be used to hold order backlogs down

"HOW SOON can we get delivery?" could become an embarrassing question for machine tool salesmen before the end of the year.

Last January, the industry made an unofficial estimate that it would ship $900 million worth of machine tools and that new orders would ring in at over $1 billion this year (STEEL, Jan. 16, p. 37). There's little doubt that the prediction about new orders will come true. But builders will have to turn on the steam to achieve their goal on shipments.

Equation — Although the shipment rate has climbed since January (see table), new orders have been rising faster. Demand is strong across the board. STEEL's midyear survey of business prospects for the second half (June 25, p. 47) shows that of companies planning expansions during the next six months, 68 per cent will buy new equipment. This potential is spread through primary and fabricated metals, machinery, transportation, instruments and miscellaneous metalworking divisions.

Though backlogs are extended longest in special and "elephant" tool categories, even buyers of standard machines can't get too much of a break on delivery. Manufacturers of standard lathes, grinding machines and millers told STEEL that they are quoting eight to nine months.

Special Situation — In the big tool bracket, deliveries now take 18 months. And that period may be extended. It's possible that many elephant tools delivered for aircraft programs are already obsolete.

Explains one Wisconsin builder: "Pretty soon, we're going to find that we have only one-quarter of the capacity we need for military aircraft machine tools. Reason: Specifications will call for tougher alloys to beat the heat barrier. We've been building machines with 200 hp that will cut aluminum alloys like T-75 at 200 ft a minute. When the industry switches to the new metals, we'll have to have 400 hp or more to get the same production."

Competition for engineers and the shortage of skilled workers

are at the bottom of many of the delivery problems.

Push — Since the first of the year, builders have been working their crews overtime to hold down backlogs. So far, they have not been successful. Since the current buying wave was sparked by the machine tool show last year, almost $1 billion in new orders has been placed. Results are that order backlogs have jumped from five months a year ago to over eight months today.

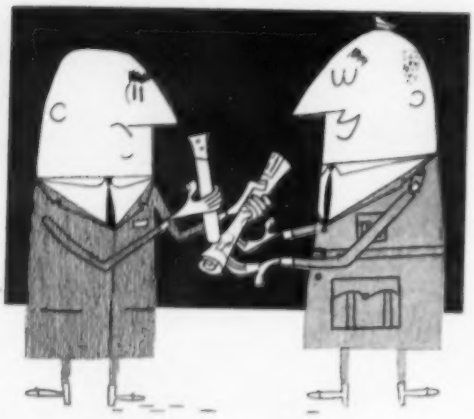
In May, for the first time this year, shipments were within striking distance of the $80 million mark the industry will have to average for the rest of the year if it is to make its $900 million target. Shipments in June may make it. Many companies recently increased their overtime scheduling. If the trend continues, two full shifts, 20 hours a day and 16 hours on Saturday may become the industry standard.

Problem—But shipments are almost sure to slide in July, when vacations will take their annual bite. The National Machine Tool Builders' Association, Cleveland, points out that even during upswings in the business cycle, shipments usually fall off 20 per cent in July, with the slowdown trailing into August.

Sources in the industry predict that shipments will slide to the $70 million mark through those two months, then pick up fast. Says one Chicago company: From September on, we'll be building up output month by month. By December, we'll be operating at a minimum of 20 per cent above our present rate.

Race — The comment is typical. Because builders are harassed by skilled manpower shortages, they'll all be pushing overtime to its economic limit. Subcontracting programs will be extended as far as possible.

If shipments are raised to over $90 million a month by December, the industry should come close to its $900 million goal. It will be difficult, but it's not impossible. During a previous business upswing, the industry was able to boost its monthly shipment rate by $30 million over a seven-month period.



Defense contracts give U.S. know-how, secrets; that's why . . .

Guard Needed on Tech Data

HOW SHOULD the U.S. use technical data it obtains in connection with defense contracts?

That thorny question has been an irritant for years. The Defense department has been trying to formulate a written policy for Part 2, Section IX, of the Armed Services Procurement Regulation. One proposed draft, submitted Dec. 1, 1954, was so severely criticized by industry, particularly the Machinery & Allied Products Institute, that a new one was written. MAPI likes this one better but still thinks improvements are necessary.

Two Types—The military services require delivery of two types of technical data under U.S. contracts: 1. Proprietary know-how, including drawings, secret processes, bills of material, etc. 2. Data necessary to operate and maintain the product. Industry doesn't object to turning over operational and maintenance data; the other kind causes the trouble.

Involved are such questions as the most desirable method of broadening the defense mobilization base, the possibility of discouraging independent research and development by industry engaged in U.S. contract work and the taking of manufacturers' proprietary data without due compensation. MAPI is also alarmed by the possibility that acquisition of proprietary manufacturing data, if abused, could become a powerful tool for the manipulation by government of the whole pattern of American industry.

Eight Principles—MAPI believes that the Defense department statement of policy should embody these rules of conduct:

1. U.S. requests for technical data should be made only when a clear and present need for it exists.

2. Technical data should be treated in procurement regulations as a separate subject, not associated, as it is now in the policy statement, with patents and copyrights. Although valuable, much technical data involved in the government's contracts are not patentable or subject to copyright.

3. The government's statement of policy should include an enumeration and definition of the uses to which technical data may be put.

4. Where the U.S. seeks to include a technical data clause in a contract which requires delivery of manufacturing data, the matter should be made invariably the subject of special negotiations, with full disclosure of how the information will be used.

5. The acquisition of a manufacturer's proprietary technical

data by the government requires appropriate remuneration.

6. When the needs of defense necessitate a secondary source of manufacture, the initial supplier should be encouraged to establish such a source by conventional licensing agreements. The U.S. often does this now, but MAPI wants a written policy statement.

7. Administration of procurement policy should encourage broad independent research and development by all manufacturers. There's little incentive for a company to use its latest developments on governmental work when the possibility exists that the government will use them to put a competitor in business.

8. A clear distinction should be made between technical data developed at U.S. expense, and to which it has claim to full title, and background technical data which are the fruit of a contractor's independent research.

Five Recommendations — Based on those principles, these suggestions are made by MAPI for changes in the latest draft of Part 2, Section IX, of the procurement regulation:

1. The statement concerning acquisition of data fails to make the distinction between background data, originated or acquired by a contractor independent of a U.S. contract, and foreground data, arising wholly out of the expenditure of governmental funds. MAPI urges that the distinction be made.

2. The institute suggests that the requirement for unlimited rights to technical data based upon a contract "having as one of its purposes experimental, developmental or research work" introduces too broad a classification upon which to base the U.S.'s unlimited right to data developed under the contract. MAPI wants the phrase to read, "having as one of its *principal* purposes . . ."

3. In the case of contracts for standard commercial products or for modified commercial items, MAPI wants development of a whole range of contract clauses permitting the transfer of technical data in any case commensurate with the needs of the U.S. in the circumstances. The institute claims that the government's present draft is confusing about policy on contracts which involve little or no new developmental or research work.

4. The government assumes no duty to notify a contractor of its plans to transfer technical data to a foreign government unless the contractor himself notifies the U.S. in advance that data disclose an invention for which he may desire to file for a patent abroad. That overlooks the situation in which a contractor may plan manufacturing or sales operations overseas, but without applying for patents. Delivery to foreign governments of technical data could foreclose future business operations abroad. MAPI urges that the U.S. pledge itself to give notice in all cases—subject to security requirements.

5. MAPI also believes that the unlimited rights clause in the draft should include an exception prohibiting the U.S. from duplication, use or disclosure of technical data for purposes of providing services or supplies to the public in competition with the contractor or with his commercial licensees.

One Objective — The institute praises the assistant secretary of Defense, Thomas P. Pike, for his realization that "the matter is not one of technical patent and copyright law and procedure. It goes to the heart of government-industry relations, efficient and economical procurement and free enterprise, as it is grounded in encouragement of individual initiative, property rights and research and development and appropriate reward therefor."

MAPI points out that the Pentagon has been co-operative. Nevertheless, it will probably be many more months before the remaining thorns will be removed or blunted.

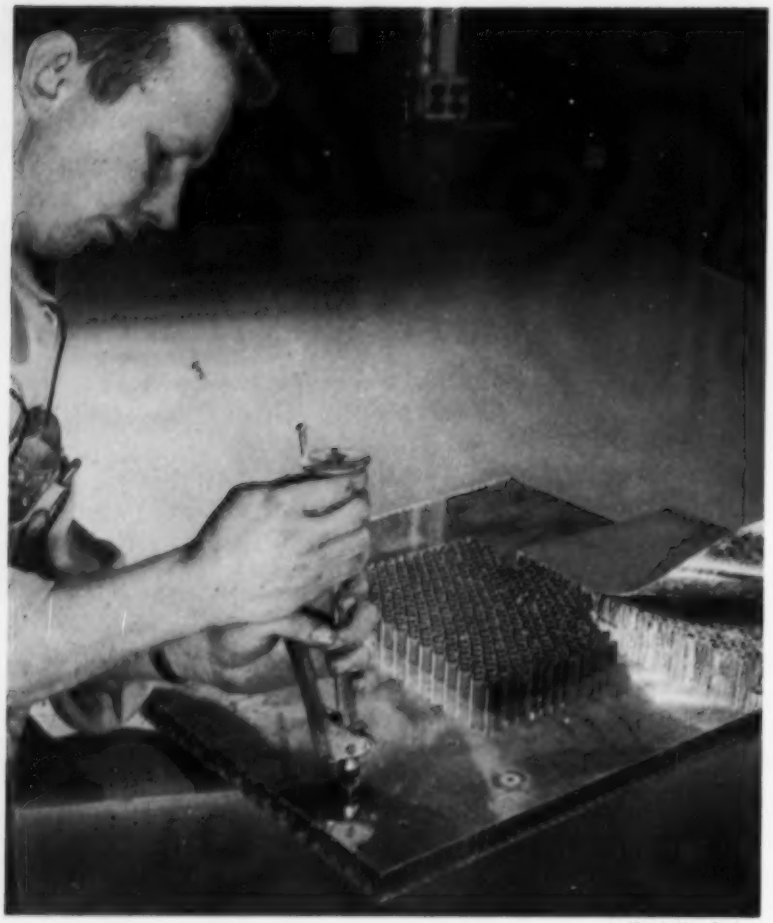
U.S. Buying Criticized

Electrical equipment producers are calling for a governmental report on the effect of large governmental imports of heavy electrical equipment on the domestic industry. The report will show that some governmental agencies are buying up to 75 per cent of such equipment abroad.

Also asked is a check on exports of grain-oriented sheet (because of tight domestic supply) and a new look at what quantities of steel, copper, aluminum and other materials the industry would need to meet mobilization demands.

Columbia-Geneva Chemical Plant Nears Completion

These Hortonspheres are nearing completion on the site of the anhydrous ammonia plant at the Geneva Works of U. S. Steel Corp.'s Columbia-Geneva Division near Provo, Utah. The chemical plant, which will be in operation late this year, will use coke oven gas from Geneva's 252 coke ovens. Annual capacity will be 70,000 tons of anhydrous ammonia and ammonium nitrate



Lockheed Aircraft Corp.

Aircraft, military and civilian uses share as . . .

Honeycombs Take Off

A HANDFUL of companies has built a $25-million industry by making a little go a long way. Their product: Honeycomb structures. Their forte: Making parts with a high strength to weight ratio.

Aircraft, military and commercial uses account for a boost in the industry's sales. (Production of honeycombs didn't become a factor until after World War II.)

Hexcel Products Inc., Oakland, Calif., expects sales this year to be a whopping 75 per cent over last year's. Solar Aircraft Co., San Diego, Calif., estimates the industry's sales of all-metal honeycombs (most honeycombs have nonmetallic cores—paper, glass, cloth or cotton) at $500,000 last year. This year, sales are estimated at $1 million to $1.5 million.

Taking the long range view, Douglas Aircraft Co. Inc., Santa Monica, Calif., expects sales of $15 million to $20 million a year in five years. In ten years, it expects sales to be $20 million to $25 million. Adm. Wilder D. Baker of Solar Aircraft says new uses will bring a $100 million a year market to the industry in ten years.

The Breakdown—Douglas estimates that about 20 per cent are used in aircraft, with substantial military uses and other fields accounting for the remaining 80 per cent. Hexcel breaks sales down this way: 90 per cent for aircraft and military uses, 10 per cent in other fields.

Do - it - yourself consumption seems to be growing. Last year, states Douglas Aircraft, 60 per cent of its production was sold as cores, 40 per cent as completed panels. This year it expects 75 per cent to be sold as cores. (For production steps see STEEL, June 11, p. 112.)

Aircraft Uses—North American Aviation Inc., Los Angeles, is using resin-bonded aluminum honeycombs on over 100 parts in production for the F-86 Sabre Jet and F-100 Super Sabre. They include trailing edges, speed brakes and fuel bay webs. North American says the honeycomb parts are lighter, smoother and have better aerodynamic surfaces than riveted parts.

Rohr Aircraft Corp., Chula Vista, Calif., is making a high temperature, steel honeycomb structure. Parts being made include wing panels, wing tips, missile wing surfaces and nacelle pylon panels.

Beech Aircraft Corp., Wichita, Kans., uses honeycomb structures for baggage shelves and radio equipment racks. Present and future applications, says Solar Aircraft, include engine seals, bearing supports, actuators, compressor castings and tailcones. However, Solar estimates aerodynamic control surfaces, wings and fuselage structures are the biggest users.

Other Uses—Schools and offices may become big users. The panels are being used to make the tops of office and school desks. Armstrong Cork Co., Lancaster, Pa., tells of 24-ft aluminum panels used for folding gymnasium partitions.

Honeycomb panels which are porcelain enameled on the outside have made their mark in the building industry. Ford Motor Co. used 90,000 sq ft of panels in its central office building, has since used more in its technical center. At the office building, the outside is

16-gage steel laminated to ¼-in. aluminum honeycomb; next is a 24-gage galvanized steel sheet, a 2-in. layer of Foamglass insulation and an 18-gage galvannealed steel sheet.

Another place where the honeycomb's high strength to weight ratio is popular is on the water. Both commercial and pleasure boats use the material.

Jets Get Tungsten

All restrictions on the use of tungsten in jet aircraft have been abolished by the Department of Defense. Sen. James E. Murray (D., Mont.) made the disclosure in debate on S. 3982. The bill, passed by the Senate June 18, directs the General Services Administration to buy domestic tungsten, asbestos, fluorspar and columbium-tantalum.

Senator Murray says the domestic tungsten mining industry has become a bountiful natural resource because of incentives provided by the government's purchase program the last five years. "The new policy of the Department of Defense," points out Senator Murray, "should remove all doubts of progressive industrial firms and research centers concerned with the development of jet aircraft. There is plenty of tungsten available from domestic mines for unlimited use in high temperature alloys."

Tungsten production in the U. S. was 15,669,000 lb last year, compared with an average annual production of 3,718,000 lb in 1946-1950.

Hearings before Senator Murray's committee gave evidence that Russia uses up to 50 per cent tungsten in its jet engine design.

ODM Speeds Freight Cars

Over $540 million for the construction of railroad freight cars, tank cars and diesel locomotives has been certified for fast amortization by the Office of Defense Mobilization.

In the two-week period ended May 30, 106 of the 110 certificates issued for the fast write-off of taxes went to railroads. The New York Central Railroad received fast tax amortization on over $113 million worth of freight cars.

Diamond Outlook

Manmade gems aren't on the market, but when they come, users have new plans ready

DON'T LOOK for synthetic industrial diamonds to be in commercial production for another six months or more, reports Metallurgical Products Department, General Electric Co., formerly Carboloy Department.

"When they do appear," says J. S. Gillespie, manager of the infant synthetic diamond project, "they will probably be in diamond grit form, which accounts for some 80 per cent of all industrial diamond sales."

Advantages—GE hopes that the synthetic stones will insure a reliable and adequate source of supply. And as production gets going, prices on natural and synthetic types may decline generally.

Eastern diamond dealers say that the possibility of having an alternate source of supply is the best news they have had for years.

Chemically, the gems have the same analysis as natural stones. They will cut any material a natural one will, but Metallurgical Products suspects that they still may have slightly different properties which haven't shown up. "It may well be," says Mr. Gillespie, "that these synthetic stones will do some things natural ones won't."

Troubles—High labor and manufacturing expense continues to keep them off the market. Another problem: Getting pressure vessels (in which the diamonds are formed) which will not leak and will withstand pressures up to 1.5-million psi.

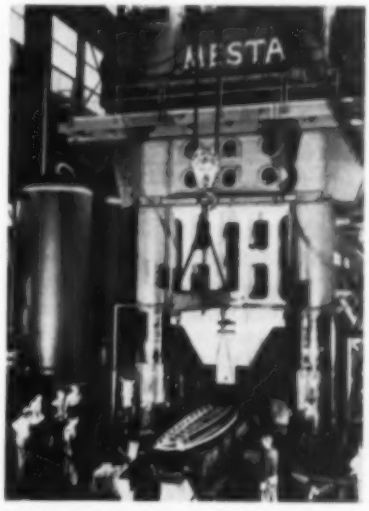
Industrial grit made from natural diamonds sells for about $2.35 a carat. Natural cutting stones may run as high as $30 a carat.

Future—Low cost synthetic diamonds may have expanded uses in grinding operations. Examples:

A plate glass manufacturer has perfected a potentially inexpensive process for grinding and polishing his product with diamonds. The project has been shelved due to the short supply of industrial diamonds. Availability of synthetics would rekindle interest.

A Detroit company is developing the use of fine industrial diamonds for dressing grinding wheels. They are bonded with a metallic material. The product would replace single point stones which are in common use. Prospects: Dressing wheels could be installed and used by semiskilled workers. Experts now work with single point and larger industrial diamonds.

Outlook: There will be more than enough room for both manmade and natural diamonds in industry.

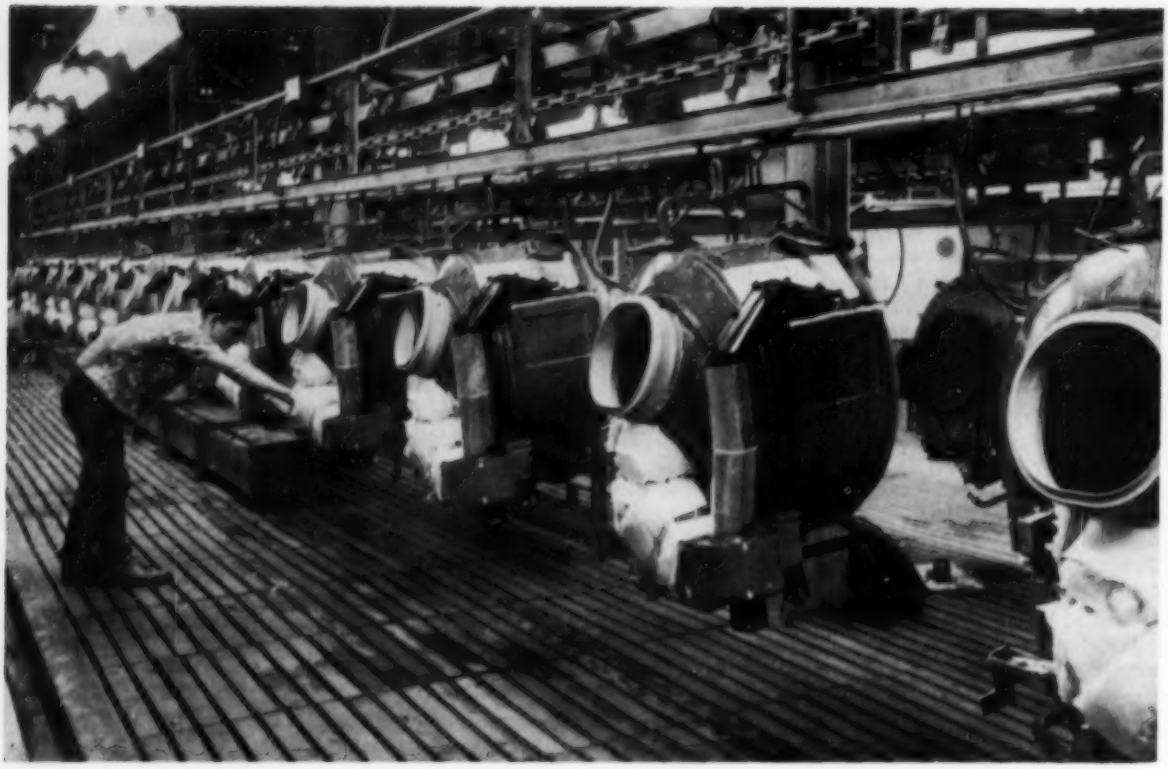


50,000-Ton Press Made It
A 3000 lb aluminum section for the multijet Martin XP6M SeaMaster is removed from the 50,000-ton press in the Air Force's plant at the Cleveland Works of Aluminum Co. of America. It is the largest closed-die forging the plant has ever produced

Bundles For Steel Mills

The scrap industry has started a campaign to provide the steel mills with better No. 2 bundles, the principal tonnage grade produced by the industry. Efforts will be made to up the quality by publicizing the need for thorough burning of old automobiles. No. 2 sheet, the principal dealer grade going into the bundles, must be free of all nonmetallics and nonferrous material.

During 1955, about 9.5 million gross tons of bundles were consumed by steel mills. Consumption so far this year is at a rate of 10 million tons annually.



Appliance lines get rolling again as . . .

Westinghouse Comes Back

WHAT would you do if your firm were hit by a long and costly strike? Westinghouse Electric Corp., Pittsburgh, began to shape its answers before the 156-day strike ended last March. Result: In most divisions, production is already ahead of prestrike levels.

To repair any damage done to its reputation by union attacks on its "You can be sure . . ." slogan, the company is adopting an aggressive campaign aimed at reselling Westinghouse's leadership.

Four Ply—While the work stoppage continued in February, advertising managers and top management mapped a four-pronged selling drive. As one executive explains, "We planned to come back into the market as dramatically as possible. We had a great opportunity to show industry and the public what strides Westinghouse has taken in atomic power, electronics, automation and other expanding fields."

First of four major efforts is the "Watch Westinghouse" campaign. This consists of consumer product advertising in newspapers and magazines. All company divisions are adopting that theme. "It emphasizes the entire forward movement of the company," spokesmen add.

On the Air—Two of the four points in Westinghouse's selling drive are dramatic programs on television and radio and TV coverage of the political campaign over the CBS network. The firm will also conduct a special advertising drive in news and business magazines which is aimed at industrial management.

Planning recovery from the strike before it ended paid off for Westinghouse. The outlook is generally bright in each division. The corporation will back its growth predictions with a plant and equipment investment of $300 million to $375 million in the next five years. It will spread its investment during that period, not concentrating on any one year.

Capital for this expansion will come from earnings.

Financing—End of the work stoppage found Westinghouse in sound shape, despite first quarter losses of $18.6 million. The company expects to recover these losses before year end.

Looking ahead, the company continued to buy steel through February. In March, it decided to cut back orders of plate and sheet. "We quickly speeded up purchasing as the strike ended," adds one buyer.

Rebuilding—Commercial and industrial products customers are clamoring for delivery. Tom Fort, vice president, estimates that overall activity at Westinghouse in April was 20 per cent over prestrike levels. The company is

shooting for a 35 per cent gain.

Electric appliance production lines, for example, went back into production fast. The company is hoping to triple prestrike sales of this product group in the next three years. During the coming year, it will introduce four new portable appliances.

Factors—The business climate has given a helping hand to the company's recovery. Throughout the strike, heavy apparatus orders came in briskly. Backlogs at the end of 1955 were well above levels of a year before. Today, it looks as though these plants will be loaded for at least 18 months.

Research and development continued at top speed during the strike. Plans call for a bigger program this year than last. In its atomic work, Westinghouse is building an atomic reactor to produce electric power for public use at Shippingport, Pa.

Mighty Atom — Westinghouse officials believe atomic energy will take a more vital role in the company "sooner than we, or anyone else, expected only two years ago." That's only one of several promising growth fields for Westinghouse.

GM Bosses Buy Stock

Nearly 90 per cent of GM's salaried employees in the U. S. are participating in a savings-stock purchase program, says President Harlow H. Curtice.

About 90,000 of the more than 100,000 eligible are saving an average of 8 per cent of their salaries. (The limit is 10 per cent.)

During the first nine months of the program, about $32 million was saved by employees and $16 million contributed by GM. In the program, one-half of an employee's savings is invested in U. S. government bonds, the other half in GM common stock. For each $2 of employee savings, the company contributes $1, which is invested entirely in GM stock.

All dividends are invested in common stock and all interest is invested in additional bonds.

The stock program has two parts—a savings fund plan and a retirement thrift plan. The employee selects the plan he prefers.

Higher Wage Concessions?

They could be greater in late '56 because of developments in steel. The metalworking average thus far has been about 8 cents an hour. Fringes have cost another 2 to 5 cents

METALWORKING contracts negotiated in the first five months of this year provide for wage boosts that average 7 to 9 cents an hour. Pay settlements may go even higher for the rest of 1956, nudged by the developments in steel.

An Associated Industries of Cleveland survey of 53 settlements made in northern Ohio in the first five months reveals an average pay boost of 8.9 cents, compared with 5.9 cents in the same period last year.

Trends — Normally, wage concessions are higher in the first part of the year, then taper off. But last year, AIC records show, average pay gains were more than 3 cents higher in the later months than in the early months. The same unusual pattern could develop in 1956.

The pattern set in basic steel is likely to be followed fairly closely in the 1500 other contracts the steel union holds with other firms. Negotiations are already under way with Aluminum Co. of America. In the past, the Alcoa contract with the steelworkers has been similar to the basic steel agreement.

Indirect Effect—In addition to the direct influence of the basic steel terms, the indirect effect is strong, too. Many contracts in the rubber industry are pending, for example, and results there are likely to show the influence of steel.

Says a steel fabricator: "We don't deal with the steel union, but customarily we grant our outfit about what the steelworkers get."

Fringe Picture — In fringes, there's less uniformity than in wage provisions. So far this year, fringes granted have cost from 2 to 5 cents an hour. The seventh paid holiday has been the most common concession; the usual arrangement is for a half day before Christmas and New Year's Day, but the Friday after Thanksgiving, election day, Good Friday and even the employee's birthday have been designated paid holidays in scattered contracts. Improved or new insurance plans have also been included in many settlements. Improved vacation grants have been common, too. New or improved pension plans have been written into many contracts involving large companies, but that provision is unusual in documents concerning small or medium firms.

The wage-fringe package so far this year averages 11 to 14 cents an hour. Look for that cost to rise.

Contracts Are Getting Longer

Fifty-six per cent of 923 union agreements signed between June, 1955, and May, 1956, run for more than one year, says a National Industrial Conference Board Inc. study. That compares with 46.4 per cent in 1950 (when NICB analyzed 303 contracts), and 24.6 per cent in 1948 (based on 313 contracts).

Of all the contracts studied this year, 10.5 per cent run one to two years; 21.7 per cent run two years; 6.8 per cent run two to three years; 14.4 per cent run three years.

Trend To Decentralize Buying

In the last five years, one firm out of five has tended to decentralize its purchasing operations, a National Conference Board Inc. study shows. The trend is much more evident in multiplant companies than single plant firms. Local purchasing units are usually limited to procuring items for maintenance, repair and operation of plant facilities, emergency items and minor miscellaneous supplies and services. Major buying of raw materials continues from the central office.

Contractors Sharpen Prices as U.S. PAs Get More Cost Conscious

Sharpen your pencil if you want to sell to the government. More and more officials are talking about assuring themselves that the government gets the lowest prices for needed supplies and that appropriated funds are wisely expended with the lowest qualified bidder at better prices. Part of the growing cost-consciousness stems from a more businesslike approach to purchasing. Another from tightened belts under the balanced budget. Still another from the same upward trend in prices felt by industry. It adds up to more shopping around and closer looks at bids and bidders by government buyers.

More Paper Work for You on Defense

If you do any work for the Defense department it will take still another piece of paper work. The department wants reports from prime contractors showing how much defense money is going to small business for subcontract work and for off-the-shelf items. The information is wanted as ammunition against congressional hollerings that "big business" hogs the defense dollar. In fiscal 1955 $3.2 billion in military contracts went directly to small business. Estimates put subcontracts at an additional $2 billion.

Congress Wants To Go Home; It Won't Act on Transport Policy

It looks as if changes in the amount of governmental regulation of the transportation industry will have to wait until next year. Despite Commerce department testimony that the changes are necessary to bring more competition into rate making and to strengthen the nation's common carrier system, there are too many objections to one or more parts of legislation proposed to carry it out. Congressional leaders fear the issue would take up too much time and end whatever hopes they have of getting home by mid-July for pre-election fencemending.

Aid to Mine Owners

Chances look good for enactment of an $87.3-million program to aid domestic producers of tungsten, fluorspar, asbestos and columbium-tantalum. The Senate already has approved; the House is considering it and passage is probable. The House may try to put a limit on the amount of tungsten that can be purchased from any one mine, even though the Senate rejected such a move. If the bill passes both houses, it's reported that the President will sign it. The measure is an interim program until a long-range national minerals policy can be worked out by the Interior department. Such a program has been promised Congress for early next year, but it may take longer than that to work it out.

Housing Bill Stymied?

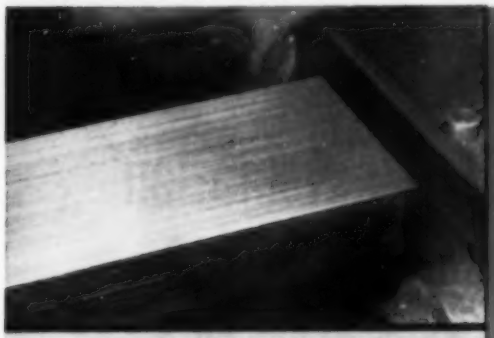
Controversy in the House may keep a public housing bill from being passed this year. The Senate has passed a program far larger than the President wants. The House Banking Committee has adopted a 180,000 unit, three-year program (also larger than the administration wants), but it's stuck in the Rules Committee. Building industry sources, though, don't seem especially worried. They have good backlogs at hand and point out that governmental agencies have money enough to keep federal housing going until Congress comes back next year.

The Uranium Market

A civilian market for uranium is growing, but even ten years from now the government will still be the principal consumer. To meet expanding use, ore production will grow from the present 3 million tons a year to about 5 million or 6 million tons. Nine uranium mills are in operation and three more are coming in this summer. Total number of mills may be doubled by 1958.

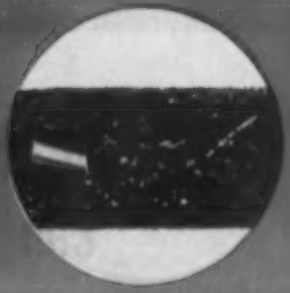
NEW, BETTER C/R way wiper

guards the life, cuts downtime, saves costly maintenance on machine tool ways

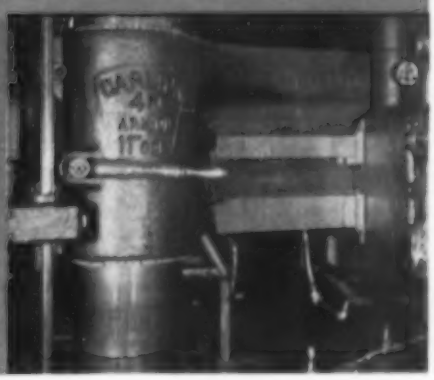


This close-up photograph shows harmful chips and abrasives trapped in a fibrous wiper that permitted scoring of the lathe way shown at left.

The extent of scoring and abrasion caused by chips trapped under the carriage is clearly shown in this photograph of a lathe way.



C/R Way Wipers are quickly, easily installed on this milling machine, as well as on shapers, grinders, planers, and gear cutters.



The clean, score-free wiping action of C/R Way Wipers is evident again in this partial view of a radial drill. Note how close, accurate lip contact on the column is achieved, even though the wiper is mounted on uneven surfaces.

How many hundreds of dollars are scoring and abrasion of machine tool ways costing your shop each year . . . dollars that could easily be saved? C/R Sirvene (synthetic rubber) Way Wipers make it unnecessary to tolerate this expensive damage. They are designed and precision molded for an extremely accurate fit. They will *not* trap harmful materials . . . will not mark or smudge ways. They will wipe ways clean of dirt, chips, fine abrasives . . . even water emulsions . . . yet leave a thin, protective oil film. C/R Sirvene Way Wipers will fit flat ways, side rails, angles, columns and hydraulic rams . . . and are easily installed. They will save you many times their cost. Please write for illustrated brochure that gives complete details.

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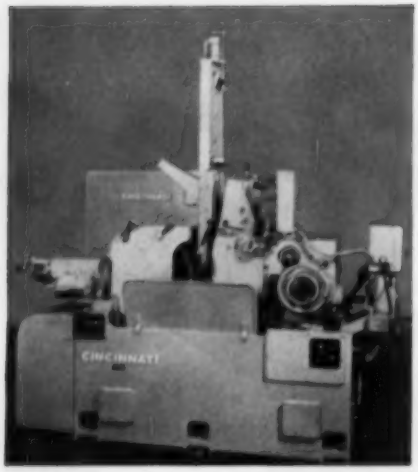


Universal joint spiders. An ingenious loading device transfers the parts from one pair of wheels to the next. Four diameters are automatically ground each cycle. CINCINNATI® FILMATIC No. 2 Centerless Grinder.

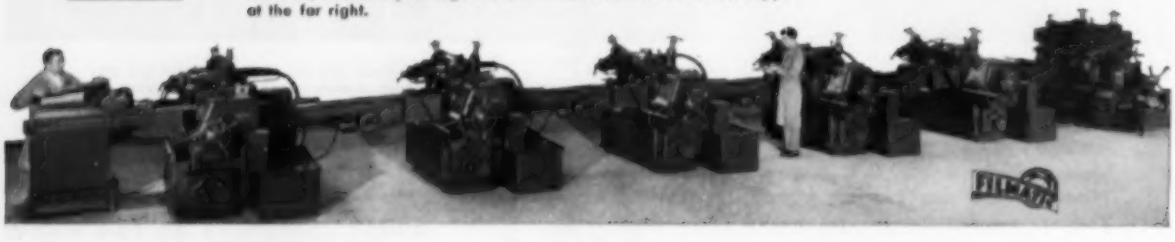
Pump shafts. A magazine type work loading fixture and automatic infeed attachment help to reduce the cost of grinding bearing grooves. CINCINNATI FILMATIC No. 2 Centerless Grinder.

...and Cincinnati Centerless Automation *can reduce costs in your shop, too*

Centerless grinding is a "natural" for automation. It can be developed to any degree required for your production, from a simple feed cycle to a complete line. Cincinnati Centerless grinding specialists have been doing this type of work for 33 years. That's one reason why it will pay you to consider Cincinnati first. Only Cincinnati can give you the advantage of long experience and a choice of *six sizes of centerless grinders.* May we hear from you?

CINCINNATI GRINDERS INCORPORATED
CINCINNATI 9, OHIO

Rocker arm shafts are loaded into the hopper at the left and transferred by conveyor from one CINCINNATI FILMATIC No. 2 Centerless to the next, and finally through the CINCINNATI FILMATIC Centerless Lapper at the far right.



Automotive valves. Parts are received from an overhead conveyor and automatically ground at the rate of 22 per minute. CINCINNATI FILMATIC No. 2 Centerless Grinder.

CINCINNATI

CENTERTYPE GRINDING MACHINES • CENTERLESS GRINDING MACHINES • CENTERLESS LAPPING MACHINES • MICRO-CENTRIC GRINDING MACHINES

How Bill Ylvisaker Uses Customer Service

CUSTOMER SERVICE—it's a major sales clincher whether you're retailing appliances or selling components to the appliance makers.

"That approach has probably been the biggest factor in our sales gains in the last two years," says William T. Ylvisaker, general sales manager of Pheoll Mfg. Co., Chicago. The evidence: Pheoll's sales in 1955 were more than 40 per cent over 1954's; this year, they're up another 30 per cent—well above the average for the fastener industry.

Multiple Approach—"We try to provide better customer service from four angles," Mr. Ylvisaker explains: "1. By training our salesmen in fastener design so that they can help customers solve problems. 2. By promoting standardization to help customers cut fastener costs. 3. By conducting technical forums to show customers what is possible in fastener design and production. 4. By streamlining our quotation and delivery service."

Many a sales manager would raise a skeptical eyebrow at taking hourly rated shopworkers and training them as salesmen. But for the last year and a half, Pheoll has taken all its new salesmen from the shop—men like machine operators and expediters. With the help of special training, their sales records have been excellent.

Tech Approach—In its standardization program, Pheoll maintains that many manufacturers are overlooking opportunities to cut their fastener costs 10 per cent or more. The company will take a customer's product into its laboratory, take it apart and analyze its fastener requirements. Objectives are to cut down on the total number of fasteners needed, as well as the number of different types required.

Technical forums are generally conducted by Pheoll personnel in customers' plants. Aimed at designers and engineers, the sessions include: A movie, talks and a question-and-answer period on the cold heading process, and what facilities Pheoll provides. "This program has been successful," Mr. Ylvisaker relates. "Since January, we've averaged two presentations a day—largest attendance in any single plant was 120."

Experienced Approach—Only 31, Bill Ylvisaker is a graduate of Yale University and a former Naval Air Corps officer. Some of his first experiences with the importance of customer service were gained while operating an automobile agency following World War II. He joined Pheoll in 1952 and spent a year in the field as a salesman. His successive positions since then include sales service manager, sales manager and general manager of the standards division. Promotion to his present post came last fall.

Bill is mild in manner and appearance, so he usually gets startled looks when the conversation turns to hobbies. His is polo playing.

How Steelmakers Use Oxygen

(Average monthly consumption in three plants)

OXYGEN USAGE	CUBIC FEET (MILLIONS)	PER CENT
Machine Scarfing	10.8	15.6
Hand Scarfing	24.3	35.1
Open Hearth Combustion	6.1	8.7
Open Hearth Decarburization	4.4	6.4
Electric Furnace	2.2	3.2
Oxygen Blowing	15.7	22.6
Scrap Preparation	2.6	3.7
Furnace Lancing	0.7	1.0
Plate and Slab Cutting	1.1	1.5
General Maintenance	1.5	2.2
Total	69.4	100.0

Ingot tons produced per month for same period (est.) 390,000
Cu ft oxygen/ingot ton 178
Source: Linde Air Products Co.

Gas Consumption Expands

Metalworking's use of industrial gases is increasing enormously with new applications in steelmaking, welding and in foundries. Distribution patterns are new, too

PRODUCTION of industrial gases is on the upswing this year. Oxygen, the bellwether of the business, is making important gains. Its consumption is being stimulated by the oxygen conversion process of steelmaking, oxyacetylene welding and the decarburizing of steel in open hearth and electric furnaces. It's also gaining acceptance as an enriching agent for blast and open hearth furnaces.

Says Julius H. Strassburger, vice president, National Steel Corp.: "The use of oxygen in the blast furnace and in other steel plant operations will increase greatly in coming years."

Economics—Firms like Linde Air Products Co., Air Reduction Sales Co. and Air Products Inc. are revolutionizing the oxygen business by designing on-the-spot generation facilities for major users. Some automatically and continuously produce oxygen from the air and pipe it directly into customers' lines.

Air Products has done such jobs for Weirton Steel Co., a division of National Steel Corp., Bethlehem Steel Corp., Ford Motor Co. and Jones & Laughlin Steel Corp.

Linde has set up nine units and has 22 more under way.

Big Customers—Reports Linde: 62 per cent of its oxygen production goes into steelmaking and metal fabricating; 23 per cent goes to the chemical industry; and the other 15 per cent to hospitals, railroads, shipbuilders, garages and others.

With these developments, industrial experts conclude oxygen output will be up substantially this year. The future: An incalculable demand exists for it in rocket and missile applications.

Acetylene, Too—While the use of acetylene in oxyacetylene processes has grown, an increasing volume of the gas is going to the chemical industry. It's used in the manufacture of vinyl plastics for furniture and auto upholstery, hoses and floor covering. Other by-products: Insulation, industrial belting, printing rollers and shoe soles.

A new use is concerned with the application of thin wear resistant metallic coatings to base metals. As new consuming plants approach capacity operations, acetylene production will continue to rise. Last year, says the Commerce department, production was up 30 per cent.

Fast Growing — Argon's use is being stimulated by the scarcity of helium. Both gases are used in the inert gas, shielded arc method of welding. Argon also finds important uses in the production of titanium and in the fabrication of nuclear reactor assemblies.

A promising new application involves a high speed method of cutting thick aluminum with an electric arc which is surrounded by an argon-hydrogen mixture.

By the end of 1956, 12 companies will be producing 550 million cu ft of argon annually.

Nitrogen—Liquid nitrogen is required as a low temperature coolant in some metallurgical processes. Already used extensively in the food packing industry, it's reported to be a satisfactory addition agent to argon in specialty welding. As a blanketing agent, it keeps oxygen away from inflammable materials.

Carbon dioxide production this year will show a modest increase over that of last year. Some of its uses: In welding and foam plastics. A carbon dioxide process for hardening cores and molds eliminates baking in the foundry.

Air Conditioners Move Up

Two companies have introduced air conditioners that do not need basement floor space. Both units eliminate the use of large volumes of cooling water.

Westinghouse Electric Corp., Pittsburgh, is producing the new residential air conditioners in 2, 3 and 5-ton units. The suggested price for a 3-ton job, which is designed to cool the average home, is around $900.

A gas fired, air conditioner furnace is being marketed by Typhoon Air Conditioning Co., Brooklyn, N. Y., a division of Hupp Corp.

New Slant on Selling

How do you get workers to welcome technical progress? On-the-job demonstrations are paying off in England, says visiting British research executive

BRITAIN may be on the way to licking one of her biggest problems — resistance to improved methods by workers and management.

Dr. Donald F. Galloway, director, Production Engineering Research Association (PERA), Great Britain, told the American Society of Mechanical Engineers in Cleveland that British management is sold on the benefits of research. Now the workers must be convinced.

Evidence—Dr. Galloway founded PERA in 1946. At that time, the government matched industry's contributions dollar for dollar. Today, private companies provide more than two-thirds of PERA's annual budget. Dr. Galloway believes that within the next few years industry will be supplying all needed funds, with governmental grants altogether out of the picture.

PERA thinks it has hit on the answer to getting worker support for improving technology. Its method: An on-the-job sales approach. If you can show British workers, thinks Dr. Galloway, you can sell them.

Education — When a member asks its help in putting a new production technique across, PERA sends out its mobile demonstration unit. This may be a truck-trailer combination equipped for movies, lectures and practical demonstrations, or a team that moves right into the plant, takes over part of the production line, sets it up for the new methods and shows the workmen how the operation will work.

PERA teams have visited over 300 plants and have given individual pitches to more than 3000 key workers. The organization also carries on training and refresher courses for all levels of production personnel.

Eagle and Lion—Dr. Galloway says that some British research practices could be adopted with profit in the U. S. British firms, for example, commit their support to PERA on a five-year basis. Results: Research projects can be carried through to the satisfaction of the experimenters.

He said he called a friend of his in this country who had been working on extrusion. When he asked how the project was going, the friend said he was on something else. "But what about those questions you didn't solve?" Answer: "They're still questions; the money ran out."

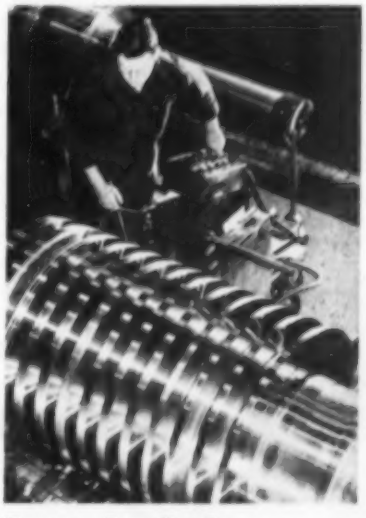
Dollarwise, Dr. Galloway pointed out that Britain trails the U. S. in research spending. He estimated Britain's total bill for research last year at $700 million, that of the U. S. at $5 billion. That means that for each man, woman and child, the U. S. spends roughly $2 for Britain's $1.

Honey Bear

Russia is back at her old game of making trade overtures to Britain. With free world export markets dropping off as a result of high British production costs, Russian offers will get harder to turn down.

The latest trade proposal would place orders for over $1 billion worth of metalworking equipment and products in British shops between 1957 and 1960. Included are electric furnaces, steel mill and foundry equipment, machine tools, instruments, pumps and compressors, "complete equipment for making printed circuit radios," material handling equipment and cargo vessels.

But the bait doesn't hide the hook. Orders will only be placed, says the report, "under proper conditions for the normalization of Soviet-British trade, eliminating discrimination."



Power for Spain

Machining the high pressure rotor of a 66,000-kw steam turbine generator at General Electric Co., Schenectady

Atomics International

AMF Atomics Inc., subsidiary of American Machine & Foundry Co., New York, will build a research reactor at Munich, Germany. It will be the first installed by a European university for training engineering students in nuclear science. Construction will start this October. Fuel will be supplied by the U. S. government.

Based on Japan's high power cost economy, National Planning Association, Washington, believes that atomic power might be made competitive there faster than in many other countries.

Trade Notes

U. S. metalworking companies considering expansion in Puerto Rico can get a cost-free, dollars-and-cents estimate of production costs from the Economic Development Association, New York . . . British contractors are successful bidders for the third steel mill in India's expansion program. Other mills are to be built by Russia and Germany . . . General Electric will supply $9 million worth of diesel locomotives to Chile and Brazil . . . Export-Import Bank, Washington, will lend Chile $3.6 million toward the cost of a reversing hot-strip mill for its integrated steel plant at Huachipato. Blaw-Knox Co. and General Electric International are supplying the equipment. Total cost is $8.5 million.

How Great Lakes Steel *molds* quality

As molten pig iron gushes from the world's largest blast furnace, a generous cupful is ladled out into small, trough-like molds.

Cooled and solidified, these "guinea pigs" (samples of the iron that goes into open-hearth steelmaking) are then rushed to Great Lakes quality control laboratories. For they hold a big chunk of the secret to producing steel that meets customer specifications *all down the line!*

They tell if the blast furnace burden is precisely balanced. They tell if as many impurities as possible have been eliminated. They help tell just what "seasoning" must be added to the open hearth charge, so every batch of steel has the desired chemical composition and drawing qualities—and no buts about it!

Quality control *every* step of the way! That's our job at Great Lakes Steel . . . that, and the kind of service you expect—*and get*—from just one phone call.

GREAT LAKES STEEL CORPORATION

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LARGEST IN THE WORLD and first with a hearth diameter of over 30 feet, the No. 1 Blast Furnace is one of four at Great Lakes. Thanks to constant control, these furnaces produce iron that, beyond question, spells higher quality steel.

District Sales Offices: Boston, Chicago, Cincinnati, Cleveland, Grand Rapids, Houston, Indianapolis, Lansing, Los Angeles, New York City, Philadelphia, Pittsburgh, Rochester, St. Louis, San Francisco, Toledo, Toronto.

Growth Potential of Auto Industry

	1930	1940	1955	1965*	1980
Automobiles (millions)	23	27	52	68	88
Population (millions)	123	132	166	190	220
Persons per auto	5.3	4.8	3.2	2.9	2.5
Avg miles per car per year	7,200	9,200	9,600	10,400	12,000
Miles per year per person	1,300	1,900	3,000	3,800	4,800
Avg horsepower per car	75	125	180	220	250
Miles per gallon (at 40 mph)	15	18	20	25	30
Gallons of fuel (billions)	14	21	46	60	84

Source: General Motors Corp.
*Estimated by STEEL

To Meet the Future

The auto industry's research teams are examining more metals, weighing the values of different power plants. Problems: Tooling costs, raw material costs, availability

TOMORROW'S auto will contain more aluminum and magnesium to cut down engine and car weight. Less nickel and more pearlitic malleable iron will be used in auto parts. The gas piston engine will be around for many years.

The predictions are made by A. L. Boegehold, manager of research, General Motors Corp., Detroit.

Rumor—Mr. Boegehold is trying to scotch a persistent rumor that gas turbine engines may appear in some luxury automobiles as early as 1958. He explains: "Size, weight and performance of the gasoline piston engine are goals which must be exceeded by the gas turbine or free piston engine if they are to displace the present piston engine." Tooling costs for a different type engine are another barrier.

New uses for lighter materials are changing these goals rapidly, but the reciprocating piston engine still looks like a stayer, says Mr. Boegehold. He adds: "The trend in the next 15 years would appear to be toward higher compression ratios (13:1) and the use of more aluminum and magnesium."

Materials — Cylinder heads will be aluminum. The oil pan and other covers will be magnesium. Pistons will continue to be aluminum alloy. Pins and connecting rods will see no change. Bearings still will be steel backed inserts of the Durex 11 or Moraine 400 type.

"Valves will continue to be of heat resisting alloys, supplemented with aluminizing both on intake and exhaust. The intake manifold will be aluminum, and the exhaust manifold will remain cast iron," he goes on. Resulting weight savings will make for more efficient engine operation in terms of pounds of fuel and in cubic feet of space per horsepower.

Crankshafts—Shell molding and the use of pearlitic malleable iron make it likely that cast crankshafts will be accepted ultimately throughout the industry, Mr. Boegehold reports. He admits the investment already made in automatic forging equipment is a major obstacle in changing to cast cranks.

Pontiac switched to the cast crank this spring. Ford uses it on some models. Rumor has it that Chevrolet will be among the volume producers to switch from forged to cast cranks for 1957 models.

Nickel — Substitutes for scarce nickel are appearing. Mr. Boegehold believes no nickel will be used in shafts and gears of future cars. He says: "Great success already is realized with a steel containing 0.50 per cent molybdenum and 0.50 per cent manganese as a substitute for SAE 4615."

Eventually, he thinks a gas turbine engine can be built with 4.75 lb of nickel. A common turbine power plant today uses about 76 lb of the metal. Free piston engines can be constructed with aluminum alloy air chambers and compressor housings to reduce nickel alloy use.

Aluminum—By 1970, the average car will use 100 lb of aluminum. The metal already is getting widespread use in transmission housings, pistons and trim items.

Aluminum engine blocks are being made experimentally by the Doehler-Jarvis Division, National Lead Co., Toledo, O. Mr. Boegehold thinks an aluminum block will be seen on cars before long. Some

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industrial experts have pegged '58 as its (limited) introduction date.

Magnesium — Although Mr. Boegehold didn't stress the point, auto engineers are becoming more enthusiastic about the potential uses of magnesium.

The GM Tech Center is rumored to be investigating a turbocharged piston engine with magnesium components. Still a long way from production, it would supply power separately to each of the four wheels.

Aims—Mr. Boegehold says future goals should be: 1. A power plant that is most efficient to operate and build and which needs the smallest quantity of strategic and scarce materials. 2. A vehicle of lowest over-all weight compatible with cost and use of plentiful materials. Low weight must be achieved without sacrificing roominess. We are not heading toward a small car, he claims.

Goodyear Springs Up

A rubber bellows air spring which can be snapped into place may play a part in air suspension units which will be seen on many 1958 cars. The bellows has been developed by Goodyear Tire & Rubber Co., Akron.

Wire beads are molded into the ends of the bellows. These beaded ends snap into place on rimlike metal plates attached to car axles and frames. The spring is sealed by air pressure.

Most air suspension units today have steel flanges on the bellows. The flanges are fastened to bolt plates on frame and axles.

J. M. Washburn, Goodyear project engineer, explains that costs are cut by eliminating these bolt plates. The snap-in bellows saves installation time and makes for easier replacement.

Unemployment Holds

Pressure from union and legislative sources has led General Motors Corp. and Ford Motor Co. to say that unemployment at their companies has reached the high water mark and will decline.

Chrysler Corp. adds that it doesn't anticipate any immediate production increase, but says it doesn't plan to lay off any more workers during the 1956 model run.

It's difficult to get accurate estimates of how many auto workers are unemployed in the country, but Labor department statistics peg the number at about 196,000. No figures are available to show how many of these have found other employment.

The UAW claims the number is low. Its reason: Most laid-off men are unskilled. They always have a tough time finding jobs. Then, too, men who do find other work lose auto company seniority if they don't return at first call. This keeps many from hunting jobs.

Unemployment is a seasonal headache in the Detroit area especially. This year, it's particularly disenchanting since it comes in the wake of predictions for another high production year which didn't hold up.

Rumors from the auto capital indicate the layoff problem will be another target for governmental big game hunters when they go on an antitrust safari against the auto makers later this summer.

Meanwhile, eligible workers are beginning to draw SUB checks and state unemployment compensation. The first SUB payment ($13.93) went to Anthony Mannino, a member of UAW Chrysler Local 7, Detroit.

U. S. Auto Output

Passenger Only

	1956	1955
January	612,079	659,508
February	555,596	675,495
March	575,234	794,015
April	547,766	753,851
May	471,994†	724,892
5 Mo. Total	2,762,669†	3,607,761
June		649,393
July		659,763
August		614,493
September		461,591
October		517,813
November		749,061
December		682,257
Total		7,942,132

Week Ended	1956	1955
May 26	108,230	167,555
June 2	77,451	125,018
June 9	105,074	134,673
June 16	100,804	139,743
June 23	105,984†	151,249
June 30	105,500*	158,402

Source: *Ward's Automotive Reports*
†Preliminary *Estimated by STEEL

Bostrom Studies Ride

Bostrom Mfg. Co., Milwaukee, maker of truck and tractor seats, is starting a two-year experiment to see how much energy a person uses in driving an automobile under varying conditions.

Tests already have spotted the facts that vibration is one factor which increases the respiration rate, flags an individual's energy and dulls his alertness.

Other studies will cover effects on vision, metabolism, heart, heat and body temperature.

Harold Bostrom, president, says surveys on truck and tractor drivers indicate spinal and lower back injuries, chronic fatigue and similar complaints apparently stem from rough riding vehicles.

The studies presumably will result in better designed seats, springs and suspension methods for trucks and autos.

Exhaust Notes

• Ford division, Ford Motor Co., reports its July production schedules have been upped 8 per cent over June's. This increase equals more than an extra day's production at the division's 15 assembly plants.

• American Motors Corp. will market the Rambler as a separate line. Starting with '57 models, the Nash and Hudson labels will apply only to AMC's larger cars. This may well set the stage for elimination of more of the AMC line as dealers discover the Rambler is the key to higher sales.

• While Studebaker-Packard Corp. and Curtiss-Wright Corp. were getting their wedding attire out again last week, Packard Division of the auto company suspended production for the rest of the model year. Some 3200 workers were laid off. It's expected that operations will be resumed in time to introduce the 1957 models next October. Studebaker Division is still turning out 1956 cars.

By Combining High Output with Adaptability

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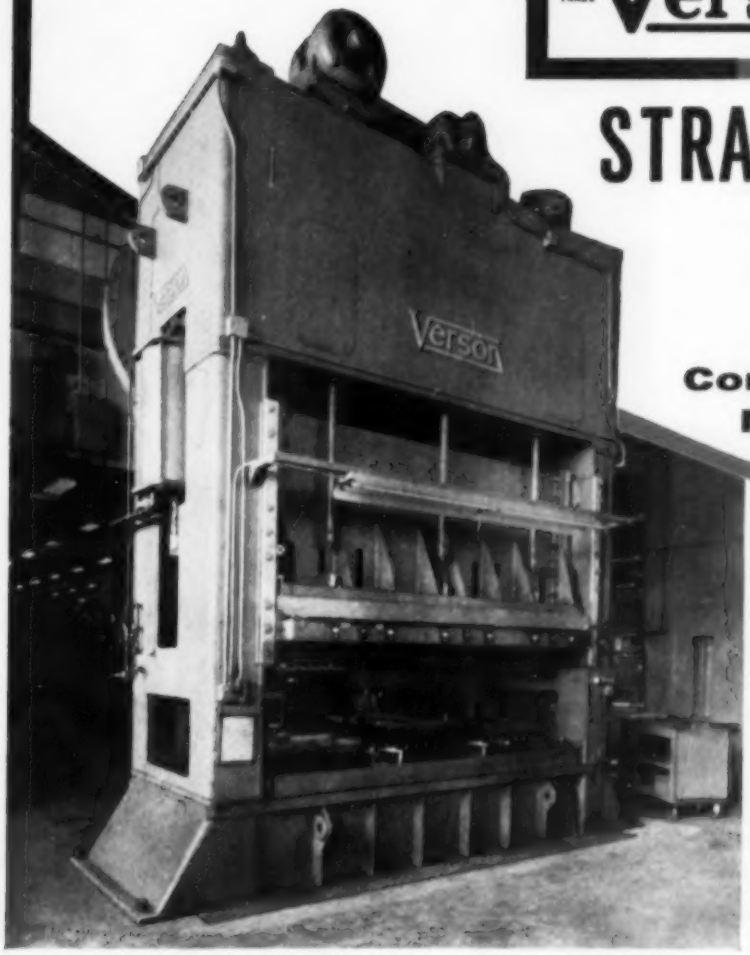
STRAIGHT SIDE PRESSES

make Contract Stamping More Efficient



400 ton Verson Allsteel double crank, single action press used for a variety of large area stampings at Northern Metal Products Co., Franklin Park, Illinois. Bolster area of the press front to back, right to left, is 60" by 120".

Versatility, adaptability and top quality performance of Verson straight side presses are allowing the contract stamper to bring production line efficiency to his shop. An example is this 400 ton Verson double crank press shown above, used for large area stampings at Northern Metal Products Co., Franklin Park, Illinois.

Verson Allsteel Straight Side Presses utilize the great uniform strength of rolled steel plate for their frames to minimize tool damaging deflection . . . and provide cleaner stampings, better draw section and savings in tool dollars. Square type gibs insure perfect alignment—nonoscillating adjusting screws assure long life and easily maintained accuracy.

This is the type of engineering for which Verson presses are noted. To a contract stamper it means greater efficiency and production with reduced costs.

We will be happy to provide you with specific recommendations on a Verson press for your operation if you will send an outline of your requirements.

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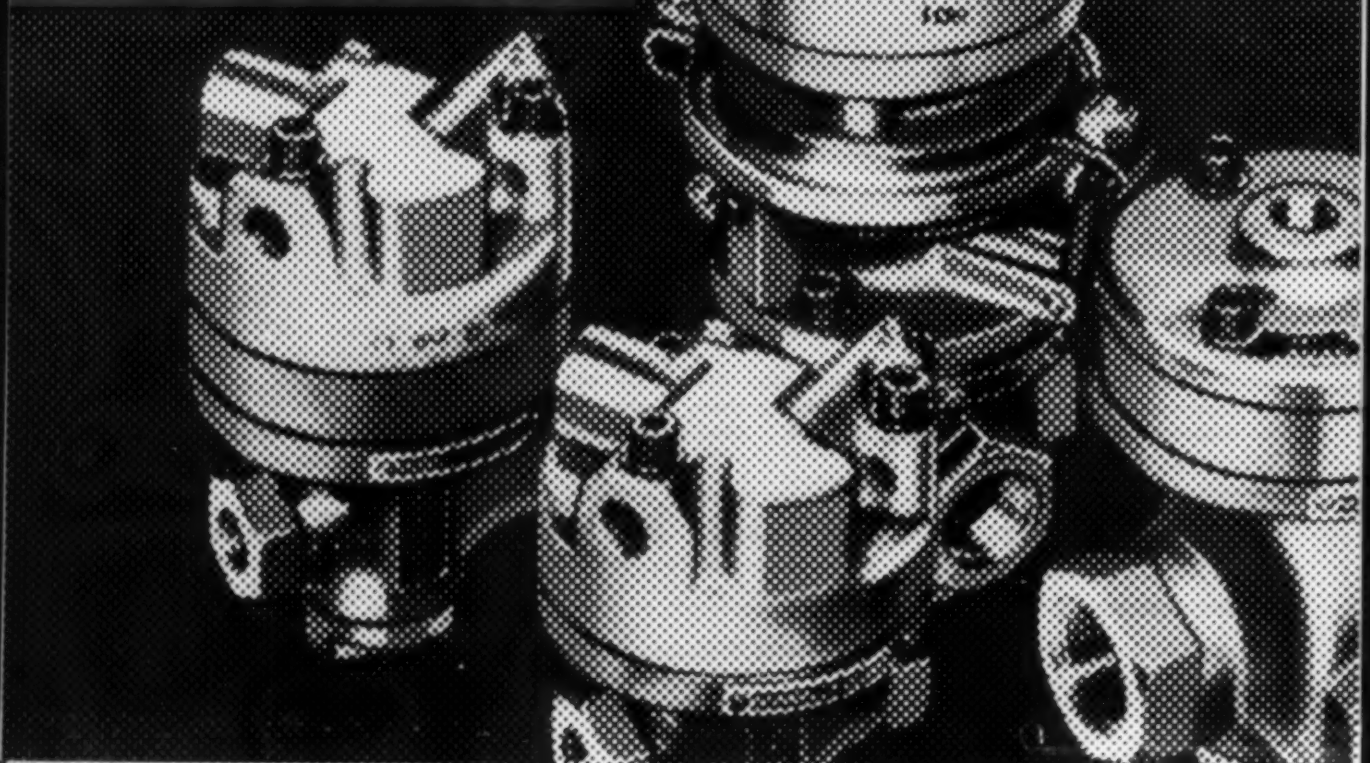

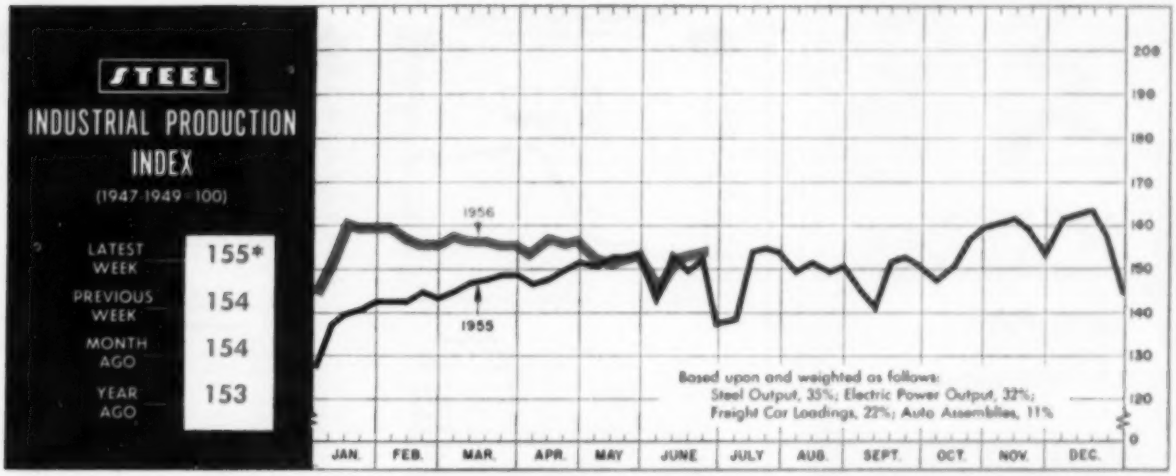

*Week ended June 23

Incorporations Point Up Economic Strength

THE BUSINESS climate has never been more favorable if you measure it in terms of new incorporations. Because they are comfortably ahead of failures, it appears that the business barometer is in the steady-to-rising range.

Not that failures can be discounted: They are at record heights, both in number and liabilities. In the first five months of this year, the number of failures has increased 14.4 per cent over the corresponding period of last year; liabilities have shot up 23.3 per cent. In the past, the high mortality rate has been a potent argument of both businessmen and politicians that small companies don't get a fair shake. The present trend in liabilities indicates that some of the larger firms are not immune to bankruptcy either.

Shakeout—In a sharply rising economy, there is always the temptation for amateur entrepreneurs to overextend themselves. When a shakeout follows, marginal outfits fall by the dozens. Tight credit, high taxes, a few soft spots in an otherwise high-level economy and just plain lack of know-how account for the high death rate so far this year.

Failure figures will continue at this high level or maybe higher, at least until the fourth quarter. The "adjustment" in the third quarter and tax payments will wash out a few more than might be expected normally.

Overbalanced — But business can't be too bad, as is evidenced by more than 64,000 new corporations formed during the first five months of this year. In four of those five months, the totals set new records for the period. This trend is building onto the growth pattern that was started last year during the early phases of the boom. From the end of 1954 to the end of 1955, there was a net increase of more than 60,000 active business establishments. The Commerce department's Office of Business Economics says this

BAROMETERS OF BUSINESS

	LATEST PERIOD*	PRIOR WEEK	YEAR AGO
INDUSTRY			
Steel Ingot Production (1000 net tons)[2]	2,314[1]	2,290	1,716
Electric Power Distributed (million kw-hr)	11,300[1]	11,425	10,226
Bituminous Coal Output (1000 tons)	10,275[1]	9,745	9,481
Petroleum Production (daily avg—1000 bbl)	7,050[1]	7,066	6,626
Construction Volume (*ENR*—millions)	$443.5	$511.9	$412.1
Auto, Truck Output, U. S., Canada (*Ward's*)	141,183[1]	133,686	191,890
TRADE			
Freight Car Loadings (1000 cars)	795[1]	801	799
Business Failures (Dun & Bradstreet)	275[1]	286	205
Currency in Circulation (millions)[3]	$30,541	$30,542	$30,035
Dept. Store Sales (changes from year ago)[3]	+12%	+9%	+2%
FINANCE			
Bank Clearings (Dun & Bradstreet, millions)	$24,630	$21,143	$22,829
Federal Gross Debt (billions)	$275.6	$276.3	$275.4
Bond Volume, NYSE (millions)	$14.5	$15.2	$20.6
Stocks Sales, NYSE (thousands of shares)	7,997	8,875	13,525
Loans and Investments (billions)[4]	$85.2	$84.7	$85.0
U. S. Govt. Obligations Held (billions)[4]	$26.7	$26.7	$32.8
PRICES			
STEEL's Finished Steel Price Index[5]	210.45	210.45	194.53
STEEL's Nonferrous Metal Price Index[6]	276.1	276.2	238.5
All Commodities[7]	114.0	114.2	110.3
Commodities Other Than Farm & Foods[7]	121.4	121.4	115.7

*Dates on request. [1]Preliminary. [2]Weekly capacities, net tons: 1956, 2,461,893; 1955, 2,413,278. [3]Federal Reserve Board. [4]Member banks, Federal Reserve System. [5]1935-1939=100. [6]1936-1939=100. [7]Bureau of Labor Statistics Index, 1947-1949=100

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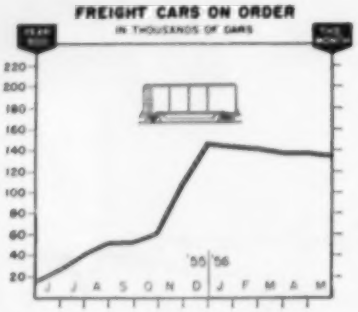
FREIGHT CARS ON ORDER
IN THOUSANDS OF CARS

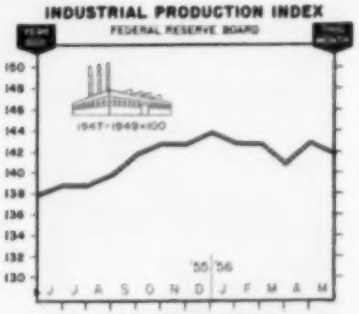


	Awards		Backlogs (end of month)	
	1956	1955	1956	1955
Jan.	1,818	5,087	144,946	18,395
Feb.	1,675	2,690	141,437	18,633
Mar.	1,618	2,156	137,070	17,974
Apr.	6,559	2,706	137,436	17,930
May	2,430	3,041	133,072	16,886
June	.....	13,365	.....	27,102
July	.....	18,007	.....	42,888
Aug.	.....	13,405	.....	52,803
Sept.	.....	3,228	.....	52,913
Oct.	.....	12,843	.....	61,954
Nov.	.....	51,066	.....	109,370
Dec.	.....	42,278	.....	147,320
Total	....	169,872		

American Railway Car Institute

Charts copyrighted, 1956, STEEL

INDUSTRIAL PRODUCTION INDEX
FEDERAL RESERVE BOARD



(seasonally adjusted)

	Total Production		Primary Metals		Metal Fabricating	
	1956	1955	1956	1955	1956	1955
Jan.	143	132	148	127	170	157
Feb.	143	133	148	131	168	157
Mar.	141	135	145	136	166	160
Apr.	143	136	145	138	171	160
May	142*	138	143*	140	168*	163
June	...	139	...	143	...	163
July	...	139	...	134	...	167
Aug.	...	140	...	139	...	170
Sept.	...	142	...	146	...	171
Oct.	...	143	...	148	...	173
Nov.	...	143	...	149	...	172
Dec.	...	144	...	151	...	172
Avg.	...	138	...	140	...	165

Federal Reserve Board. *Preliminary

brought the business community up to 4,252,000 companies, not counting firms which discontinued for other than bankruptcy reasons.

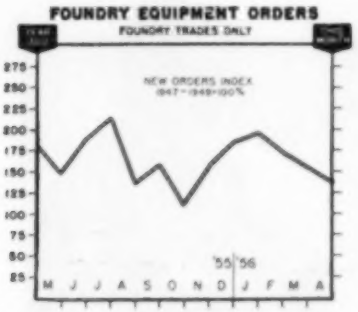
How large the active community will be at the end of this year depends on how severe the shakeout is in the third quarter and how strong the comeback is in the fourth. But it is reasonable to assume that the two will nearly balance, resulting in a net increase of more than 60,000 new business firms this year. That will push the total to more than 4,312,000.

Construction Upped Again

Construction continues to set one of the fastest paces in all industry, heading for what the government now says will be a $44.5 billion year. That will top the previous record year (1955) by about 4 per cent, say the Commerce and Labor departments. Private housing is still the weakest segment of the industry, but some of the decrease in new starts will be made up by increased costs. While the two departments now predict 1.15 million starts this year, there are still those who are holding out for 1.2 million. The decrease, which ran through most of 1955 and into the first of this year, has leveled off for the last four months. Part of the contraction was because of tightening credit, especially on low-down-payment homes. With the apparent easing of credit over the last three or four weeks, some pickup in home buying will bolster the normally heavy summer construction work. By the end of August, the experts should be able to pinpoint the annual figure for housing starts.

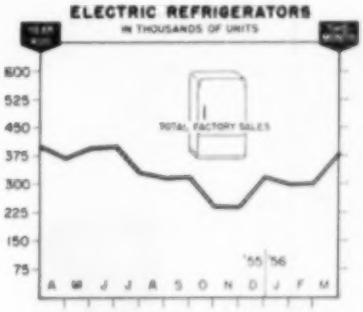
The big guns behind the building boom are utilities, private industrial buildings and highways. While the new highway bill is not expected to boost roadbuilding directly this year, it will result in a speed-up of many projects which have been hanging fire until the fate of the big bill was certain. State roadbuilding this summer and fall will cause many a tourist to mutter under his breath because of detours.

Private spending for new industrial plant expansion will jump from $2.4 billion last year to about $3 billion this year. This is corroborated by STEEL's midyear survey of business executives in which 27 per cent of the respondents said they will begin expansion projects



	1956	1955	1954
Jan.	195.6	81.0	173.8
Feb.	169.0	90.4	99.9
Mar.	152.7	163.6	82.7
Apr.	135.2	178.6	125.3
May	....	145.7	80.8
June	....	186.8	86.4
July	....	213.4	68.8
Aug.	....	134.0	75.6
Sept.	....	156.7	68.3
Oct.	....	108.6	147.5
Nov.	....	184.4	61.4
Dec.	....	183.9	113.9

Foundry Equipment Mfrs. Assn.



Total Factory Sales—Units	1956	1955	1954
Jan.	292,090	381,197	344,401
Feb.	298,742	338,575	334,122
Mar.	381,485	392,774	330,641
Apr.	.....	364,296	280,900
May	.....	390,385	282,164
June	.....	395,936	303,127
July	.....	323,240	325,061
Aug.	.....	310,789	256,665
Sept.	.....	313,143	271,859
Oct.	.....	235,945	190,753
Nov.	.....	234,786	175,557
Dec.	.....	312,535	228,612
Total	.....	3,993,603	3,323,562

National Electrical Mfrs. Assn.

in the second half of 1956 (see STEEL, June 25, p. 47). Privately owned utilities will make significant contributions to the total as they continue their efforts to match the needs of a growing population.

Freight Car Backlog Dips

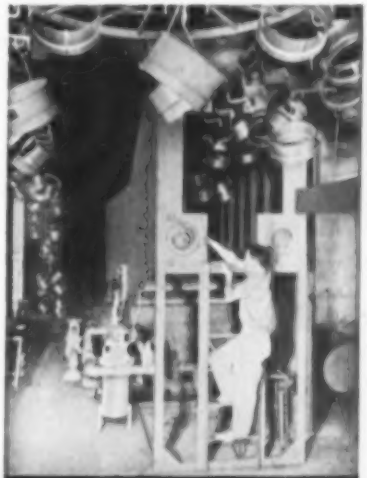
Deliveries of new freight cars to the railroads in May totaled 6667, the highest number for any month since October, 1953. But new orders slid from the 1956 high of 6559 in April to 2430 in May, reports the American Railway Car Institute. This leaves a backlog of 133,072 cars (see chart, page 52), which will carry the industry through 1957 and into 1958. New orders for June are expected to be above the May level because of several large orders late in the month. The improved delivery position reflects a slight easing in the supply of structurals and plates, but the industry still is limited by a shortage of these materials.

Index Nears High Mark

STEEL's industrial production index nearly made it back up to its first quarter level during the week ended June 23, mainly on the strength of near record electric output and heavy freight car loadings. It registered a preliminary 155 (1947-1949=100), just 3 percentage points shy of the high-water mark for the second quarter. Hot weather was the big factor. Millions of air conditioning units ate up electricity for the first time this year. A small but encouraging portion of the pickup was registered by the automobile industry—producers boosted their schedules by about 5 per cent on the strength of livelier retail sales. Only steel operations experienced some contraction as mills began scheduling long-overdue repairs to furnaces.

Foundry Equipment Slow

New orders for foundry equipment in April continued the decline from the year's high in January (see chart, above), but the pickup is expected to come in May and June. Enthusiasm generated at the American Foundrymen's Society's May meeting and preparations for the revival of automotive production late in the third quarter will turn the trick.



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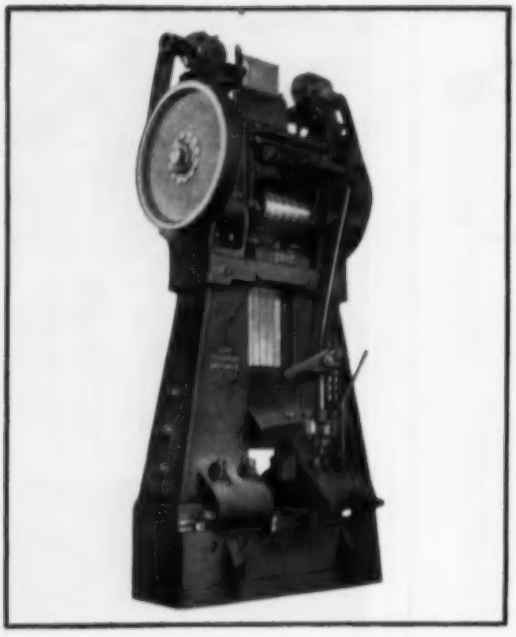
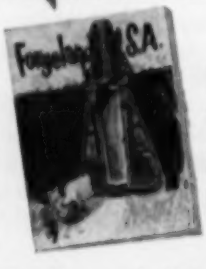


"Gee, Dad--I bet you forged it in one impression on that big 10,000-lb. Board Drop Hammer!"



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. . . *Eberhardt-Denver president-gen. mgr.*

STANLEY LAMBERT
. . . *Kurt Orban vice president*

JOSEPH P. CHAYKA
. . . *Detroit Broach chief engineer*

Robert O. Bass was elected president and general manager, **Eberhardt-Denver Co.**, Denver, recently purchased by Morse Chain Co., division of Borg-Warner Corp. **Stanley J. Roush** was elected chairman of Eberhardt-Denver to replace **Fred Eberhardt.** Mr. Roush is also president-general manager of Morse Chain.

Robert O. Miller was made manager of sales, **Korhumel Steel & Aluminum Corp. of Wisconsin,** Milwaukee. He was administrative assistant-sales.

Robert H. King was elected president, **Pivot Punch & Die Corp.,** North Tonawanda, N. Y. He continues as chairman. **Edward H. Huntzinger** was elected vice president - manufacturing. **Roland P. Cercone** was named vice president-sales.

Donald E. Pierce was made manager of **Brush Electronics Co.'s** equipment sales department, Cleveland. He was assistant manager.

Brook Wiggins was made production superintendent of the Hagerstown, Ind., plant of **Perfect Circle Corp.**

Harold A. Ketchum was elected financial vice president, **Federal Pacific Electric Co.,** Newark, N. J. He was vice president-controller at Fasco Industries Inc.

Stanley Lambert was elected a vice president and sales manager, steel division, **Kurt Orban Co. Inc.,** Jersey City, N. J.

Charles M. Reesey, advertising manager, and **A. H. Dall,** director of standard machine tool engineering and development, Cincinnati Milling Machine Co., Cincinnati, were elected vice presidents of the sales subsidiary, **Cincinnati Milling & Grinding Machines Inc.**

Charles J. Stotzel joined **Cleveland Hardware & Forging Co.,** Cleveland, as superintendent, forging division. He was chief engineer of Walker Forge in Racine, Wis.

Walter P. Barrett was made manager of the pipe fabrication department of **Dravo Corp.'s** machinery division. He has headquarters in Pittsburgh. Mr. Barrett was manager of the division's New York office.

Van Horn Ely Jr. was named president, **Oxy-Catalyst Inc.,** Wayne, Pa., to succeed **Eugene J. Houdry,** founder of the firm, who becomes chairman and continues to direct research and development. Mr. Ely was also elected treasurer. **William Epes** was elected secretary; **Gordon P. Larson,** executive vice president; **Jacques Houdry,** vice president-industrial division; and **Pierre Houdry,** vice president-automotive division.

Joseph P. Chayka was made chief engineer, **Detroit Broach & Machine Co.,** Rochester, Mich. He joined the firm in 1954 as machine and fixture engineer and was previously with Michigan Broach Co.

Leeds & Northrup Co., Philadelphia, appointed **G. Lupton Broomell Jr.** assistant director of engineering, acting head of engineering and inspection departments and a member of the executive operating committee. He succeeds **John W. Harsch,** director of engineering, who will retire Aug. 31. Mr. Broomell was chief engineer. **Donald E. Moat** was made director of marketing. He was assistant marketing director.

Norman B. Obbard was made an assistant executive vice president-operations, **United States Steel Corp.,** Pittsburgh. He is succeeded as president, **American Bridge Division,** by **Austin J. Paddock.**

Arthur J. Loose was elected vice president, **Vapor Heating Corp.,** Chicago. He continues as vice president in charge of Texsteam Corp., Houston subsidiary.

Webster Mfg. Inc., Tiffin, O., elected **J. B. Nordholt Jr.** president; **C. S. Jones,** vice president-engineering; **J. S. Nordholt,** vice president-manufacturing; and **Harry E. Byrne,** secretary-treasurer. **J. B. Nordholt,** former president, was

LLOYD R. COOPER
. . . chief metallurgical eng. at Heppenstall

RAY J. SCHWAB
. . . Delron sales manager

WILLIAM J. LOACH
. . . Firth-Loach Metals president

elected chairman to succeed **Arthur L. Hossler.**

Lloyd R. Cooper was made chief metallurgical engineer, **Heppenstall Co.**, Pittsburgh. He was assistant chief metallurgical engineer.

C. N. Frame was made manager, chain saw department, **Atkins Saw Division,** Borg-Warner Corp., Indianapolis.

George W. Plumly was made western region sales manager, **Wyman-Gordon Co.**, with headquarters in Fort Worth, Tex. He is succeeded by **A. Joseph Pepin** as manager of sales, Worcester, Mass., division.

Robert S. Goodyear was elected president, **Fenwal Electronics Inc.**, Framingham, Mass. He was vice president-chief engineer of Victory Engineering Corp.

Ives L. Harvey was made sales manager, carbon products division, **Speer Carbon Co.**, St. Marys, Pa. **C. S. Boland** was made assistant sales manager of the division and sales manager of flashlight and carbon products.

W. R. Arbuckle was named manager of **Westinghouse Electric Corp.'s** refrigerator-freezer department at Columbus, O., replacing **S. J. Stephenson,** recently promoted to manager, portable appliance division. **F. A. Lowery** replaces Mr. Arbuckle as manager, water heater **and kitchen utilities** department.

Ray J. Schwab was made sales manager, **Delron Co. Inc.**, South Gate, Calif. He was Chicago branch manager for Cherry Rivet Division, Townsend Co.

George A. Smith was made production manager, Yale Materials Handling Division, **Yale & Towne Mfg. Co.**, Philadelphia. He was formerly with I.B.M. Corp. **Michael F. Ryan** was named manufacturing assistant to Yale & Towne's general manager.

William R. Gealey was appointed superintendent of the rolling department, Butler, Pa., works, **Armco Steel Corp.**

David W. Thomas was named manager and **Albert Lang,** assistant manager of the Chicago plant of **Solar Steel Corp.**

Philip J. Berg was assigned to **Dravo Corp.'s** home office in Pittsburgh to handle sales engineering of DeLaval blast furnace blowers and Dravo-Lurgi sintering plants. He was manager of the Detroit office of Dravo's machinery division.

R. J. Lutz joined the engineering department of **Convair Division,** General Dynamics Corp., San Diego, Calif. He will specialize in research and development.

K. M. Thompson was made manager of the metropolitan New York branch sales office of **Ruud Mfg. Co.**, Kalamazoo, Mich. He succeeds the late **Don C. Nicol.**

William J. Loach, executive vice president and cofounder of **Firth-Loach Metals Inc.**, McKeesport, Pa., was elected president to succeed **L. Gerald Firth,** who continues as director. **M. A. Cancelliere,** chairman, assumes responsibilities of vice president.

Wallace S. Berry was made director of research, automotive division, **American Motors Corp.**, Detroit. He was chief mechanical engineer for the division.

Marlin C. Hinds was made assistant secretary-treasurer and purchasing agent, **Connors Steel Division,** H. K. Porter Company Inc. at Birmingham. He succeeds **Michael N. Hoke,** retired.

Dr. Kenneth W. Brighton was appointed general manager, new products department, **American Can Co.**, New York. He was associate director, research division.

James V. Huebner was made assistant manager, application engineering department, **Formsprag Co.**, Van Dyke, Mich.

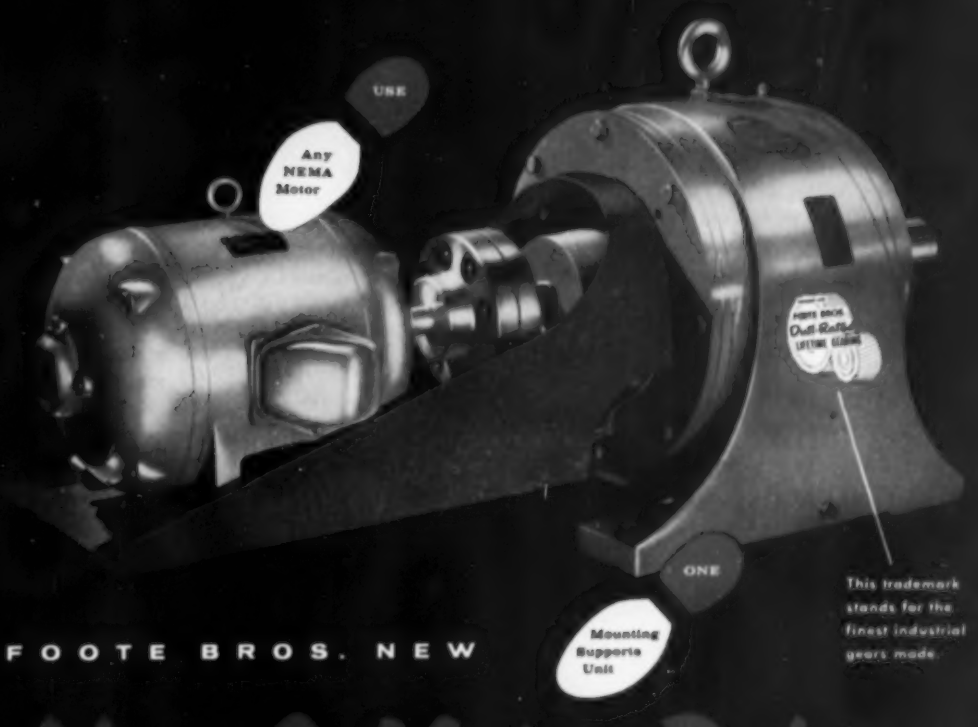
William H. Kinney was made assistant to the vice president-operations for **Kaiser Steel Corp.**, Oakland, Calif.

William A. Schrader was made assistant sales manager, **Wales-Strippit Corp.**, North Tonawanda, N. Y.

Bernard Fuller replaces **Robert King** as Detroit district sales

Basic Idea

SOLVES MANY REDUCER MOUNTING PROBLEMS



FOOTE BROS. NEW

Line-O-Motor Drive

One base supports both speed reducer and motor in this simple, practical and foolproof mounting system . . . Now you can use standard N.E.M.A. motors and make change-overs in minutes – reducing both costly down-time and motor inventory.

Line-O-Power motorized drive solves many old problems . . . and opens new fields of advanced design for new applications. Available 1-75 H. P. for all Service Classes – Horizontal, Vertical, and Vertical Extended with Foot or Flange mounting – Double or Triple Reduction units available in Ratios from 5.06:1 to 238:1.

FOOTE BROS.

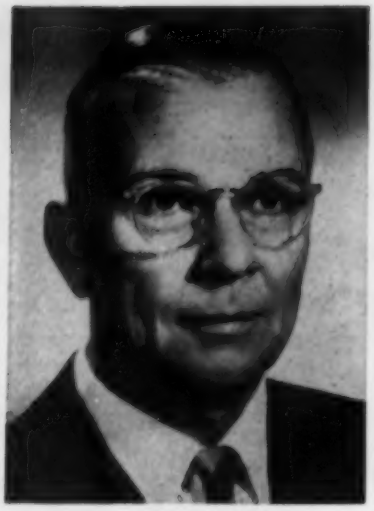
Better Power Transmission Through Better Gears

4545 S. WESTERN BLVD., CHICAGO 9, ILLINOIS

Department X

Write for your Line-O-Motor Catalog today

GORDON L. SCHUSTER
. . . Despatch Oven president-gen. mgr.



WILLIAM L. MARTIN
. . . Potter & Johnston sales manager

T. H. PRICE
. . . president of Hill-Clarke Machinery

manager for **Hevi-Duty Electric Co.**

Gordon L. Schuster was elected president and general manager, **Despatch Oven Co.**, Minneapolis. He was vice president and chief engineer.

Robert H. Butt was made manager, field engineering department, **Huck Mfg. Co.**, Detroit.

Robert B. Snider was made manager of development engineering, **Maintenance Inc.**, Wooster, O. He was formerly with Borg-Warner Corp.'s new products division.

Walter E. Billingham was made assistant superintendent, Indiana Harbor coke plant, **Youngstown Sheet & Tube Co.**, East Chicago, Ind.

Charles J. Falk was made manager-engineering for **General Electric Co.'s** distribution assemblies department at Plainville, Conn. He was manager-special products design engineering in the x-ray department at Milwaukee.

William L. Martin was named sales manager, **Potter & Johnston Co.**, Pawtucket, R. I. He was assistant sales manager.

C. G. Tournay was advanced from comptroller and assistant treasurer of National Steel Corp., Pittsburgh, to assistant to the president of **Weirton Steel Co.**, Weirton, W. Va., a National Steel division.

Louis A. Karg was made manager of the Hartford, Conn., district sales office, **Northeastern Steel Corp.**

Harry T. McKay was made management sales representative and **Gordon M. Bartage**, area manager in the Chicago office of **Westinghouse Electric Corp.**

William C. Forsyth succeeds **Francis L. Lindemuth**, retired, as chief engineer of **William B. Pollock Co.**, Youngstown.

Adolph H. Kuechler was made director of research by **American Emery Wheel Works**, Providence, R. I.

T. H. Price was elected president of **Hill-Clarke Machinery Co.**, Chicago. He succeeds **Walter L. Ditfurth** who retired in May. **R. B. Colter** was elected vice president-works manager; **Elwood R. Mons**, treasurer and **William E. Martin**, secretary.

Richard G. Cesar was named manufacturing control supervisor of **McCulloch Motors Corp.**, Los Angeles.

R. W. Long was made director of commercial sales, **Wills-Meyers Inc.**, La Jolla, Calif.

George E. Shafer was made vice president - engineering, **Armco Drainage & Metal Products Inc.**, subsidiary of Armco Steel Corp., Middletown, O. He was chief engineer.

John D. Kuppenheimer was made eastern sales manager and export sales manager for **Industrial Systems Co.**, representative of Industrial Washing Machine Corp. He is at Worcester, Mass.

OBITUARIES . . .

Thomas J. Watson, 82, chairman, **International Business Machines Corp.**, New York, died June 19.

Joseph F. Taylor, 67, chairman, **Bausch & Lomb Optical Co.**, Rochester, N. Y., died June 13.

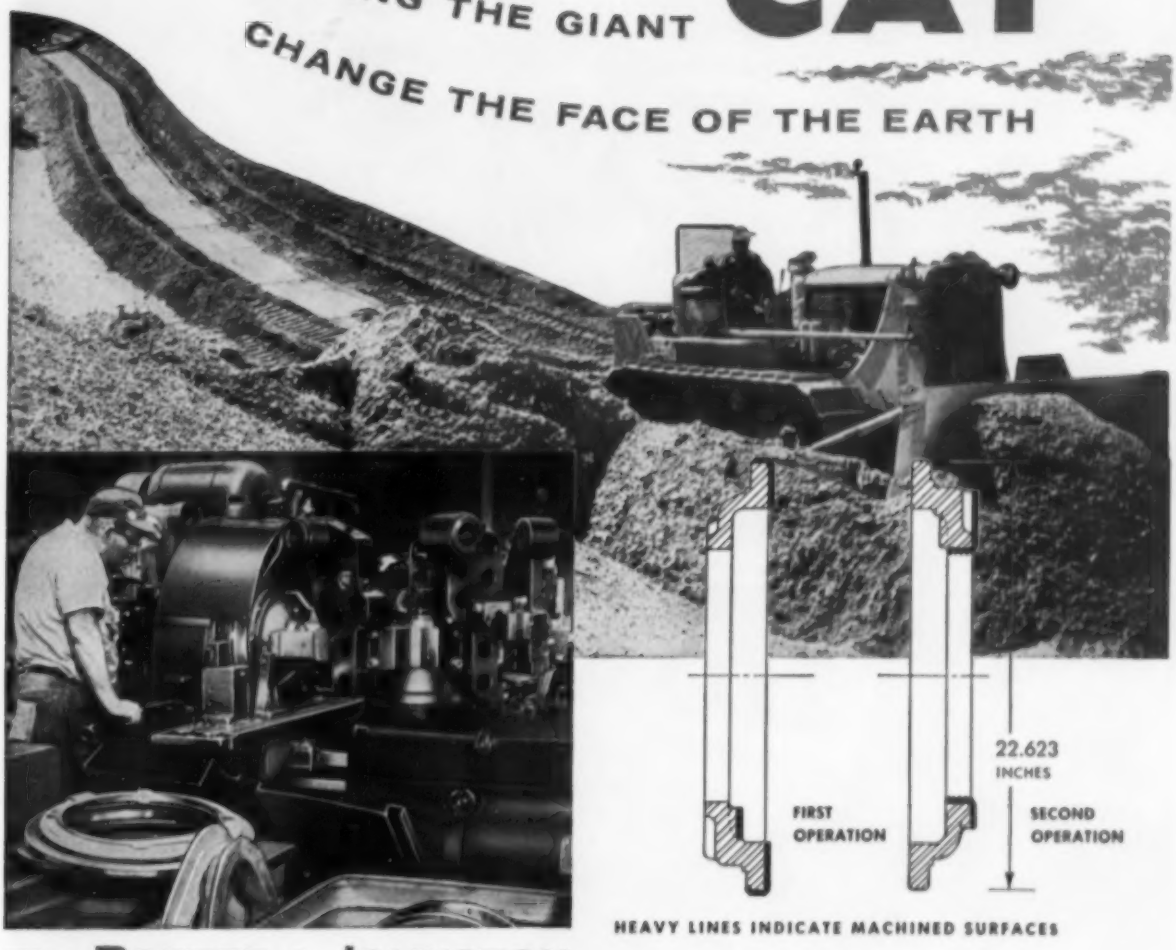
Richard S. Davis, 60, president, **Denman & Davis**, Clifton, N. J., died June 12 in Ottawa, Canada.

Roy H. Davis, 71, for 28 years president of **Atlas Steels Ltd.**, Welland, Ont., Canada, died June 24. He became chairman last April.

James B. Janis, 52, production manager, **Rhynes Mfg. Co.**, Los Angeles, died June 4.

Frank A. Poor, 76, a founder and vice chairman of **Sylvania Electric Products Inc.**, New York, died June 17.

HELPING THE GIANT CAT* CHANGE THE FACE OF THE EARTH



HEAVY LINES INDICATE MACHINED SURFACES

The POTTER & JOHNSTON 6-DRE-40 Automatic

NAME: *Bracket Flywheel*
MATERIAL: *Steel Casting*
REQUIRED: *2 Automatic Cycles involving several precision cuts AND A 15¼" – 12 N F THREAD!*

Chucking Turret Lathe Produces BIG parts like this QUICKLY, ACCURATELY and ECONOMICALLY

Virtually "changing the face of the earth" is a rough, tough job that takes rugged, built-for-the-purpose equipment like the famous CATERPILLAR Tractors. And turning out component parts for these mighty marvels is a tough job too . . . one that calls for the rugged power, extra rigidity and all-round versatility of a machine like the POTTER & JOHNSTON 6-DRE-40 Automatic Chucking Turret Lathe.

**Caterpillar and Cat are Registered Trademarks of Caterpillar Tractor Co.*

If *you* have difficult machining jobs – and who hasn't in these days when complex parts must be produced fast – why not borrow a page from the CATERPILLAR success story. Depend on a POTTER & JOHNSTON AUTOMATIC. Get started today . . . write for full information on the P&J 6-DRE-40 and on the other Automatic Chucking Turret Lathes in the complete P&J line.

Bulletin No. 159

Precision Production Tooling for more than Fifty Years

POTTER & JOHNSTON COMPANY

PAWTUCKET, RHODE ISLAND

SUBSIDIARY OF PRATT & WHITNEY COMPANY, INCORPORATED

P & W BRANCH OFFICES: Birmingham • Boston • Chicago • Cincinnati • Cleveland • Detroit • Los Angeles • New York • Philadelphia • Pittsburgh • Rochester San Francisco • St. Louis EXPORT DEPT: Pawtucket, Rhode Island AGENTS: Dallas, Southwest Industrial Sales Co. • Houston, Wessendorf, Helms & Co.

MODERNIZE WITH POTTER & JOHNSTON . . . REPLACE FOR PROFIT

This installation consisting of seven hand-propelled cranes on a flexibly suspended runway is used for stripping wire blocks in a large steel mill. Note how easy it is with the Cleveland Tramrail design to position the runway at any level or location desired. Likewise, it is extremely simple to dismantle and relocate the equipment to serve some other application, should such ever be necessary.

FLEXIBLE SUSPENSION

Assures Smooth Crane Operation

CLEVELAND Tramrail's unique flexible suspension method of supporting crane runways prevents binding of wheels on the tracks and assures smooth easy rolling operation, regardless of location of the load on a crane bridge.

The floating runways compensate automatically for normal skewing or twisting of crane bridges.

This is one of the reasons why hand-propelled Cleveland Tramrail cranes can be used for so many jobs where motor-driven cranes would otherwise be required.

Operation is so easy that Cleveland Tramrail guarantees a starting effort of 15 lbs. and running effort of 10 lbs. per ton weight.

Write for free copy of illustrated booklet No. 2008, "Engineering and Application Data".

CLEVELAND TRAMRAIL

Overhead Materials Handling Equipment

CLEVELAND TRAMRAIL DIVISION • THE CLEVELAND CRANE & ENGINEERING CO. • 7812 E. 290th ST. • WICKLIFFE, OHIO

Fabricator Expands

Chicago Heights facility will boost Luria Engineering Co.'s capacity 100 per cent

A STEEL fabricating plant is being erected by Luria Engineering Co. on Joe Orr road, Chicago Heights, Ill. It will double the productive capacity of Luria, designer, fabricator and contractor of steel industrial buildings and aircraft hangars. The company is a division of Luria Steel & Trading Corp., New York.

The 91,200 sq ft plant is the fourth expansion for the rapidly growing concern since 1950. A 40,800 sq ft addition to its factory at Bethlehem, Pa., in 1954 doubled the company's capacity. The Bethlehem plant, which is working two shifts, will continue full production after the Illinois factory is in operation next fall.

Governmental Work — Production will include an advanced type aircraft maintenance dock for the Air Force under a $9,841,500 contract. Facilities will include the latest steel fabrication, welding and painting equipment. Overhead traveling cranes and jibs will move steel from one position to another on the production line.

An acetylene-oxygen unit will cut heavy steel beams four times as fast as mechanical sawing machines. It cuts steel three ways at one time.

A 4000 sq ft office building will be constructed near the plant entrance.

Wolverine Tube Orders Press

Loewy-Hydropress, division of Baldwin-Lima-Hamilton Corp., Eddystone, Pa., has been awarded a contract for a 3000-ton, water-hydraulic extrusion press installation for the extrusion of brass and copper tubing. It is part of an expansion program for Calumet & Hecla Inc.'s Wolverine Tube Division, Detroit.

Enters Impact Extrusion Field

Production of impact extrusions gets under way this month at a new firm, Impact Extrusions Inc., Valparaiso, Ind. The company is headed by N. E. McDonald, former manager of the Impact Extrusion Division, Magnesium Co. of America.. First products will be aluminum components for the automotive, appliance and aircraft industries.

Outsized Crucible Demand Gains

A continuous kiln to accommodate silicon carbide crucibles and retorts up to 6 ft tall is being installed at Electro Refractories & Abrasive Corp., Buffalo. Demand for supersized crucibles, paced by aluminum producers, has more than doubled in the last two years. Giant retorts, weighing as much as 1000 lb, are being used by zinc smelters.

Silicon Carbide Capacity Boosted

Carborundum Co., Niagara Falls, N. Y., will construct an addition to its silicon carbide furnace plant in Vancouver, Wash. It will be equipped with an additional battery of electric resistance furnaces and other processing facilities. The addition will increase the plant's capacity by 16 per cent.

Pipe Plant Changes Hands

Whiting Corp., Harvey, Ill., acquired controlling interest in Streed Fabricating Co., Attalla, Ala., maker of stainless steel pipe and fittings, Roto-Splint flanges and processed pipe and fittings for paper mills and chemical plants. Capacity of the Streed plant will be doubled.

Equipment Maker To Build

American Research Corp., Bristol, Conn., is erecting a plant in Farmington, Conn. The firm's products include environmental test equipment.

Plans Greater Uranium Output

Union Carbide & Carbon Corp., New York, has launched a multimillion dollar expansion program that will greatly increase uranium production of Union Carbide Nuclear Co., a division. A uranium processing mill will be constructed at Rifle, Colo. Two ore-receiving stations and chemical upgrading plants to treat the ore and produce higher concentrations of uranium

New Press Handles Wide Variety of Stampings

This 400-ton, blanking, forming and multiple operation press, built by Verson Allsteel Press Co., Chicago, increases capacity of Worcester Pressed Steel Co., Worcester, Mass., to handle large area parts. Standing more than 20 ft high, it has a bed area for inserting dies up to 42 in. in width by 7 ft in length. The press is equipped to blank large sheets at the rate of 1200 strokes an hour. Eight sets of drawing tools can be set on the bed side by side for drawing heavy parts up to 8 in. in depth. Three separate pressure pads permit the operator to vary depths of the draw and complete up to 600 parts an hour

will be built at Slick Rock, Colo., and Green River, Utah.

Ingalls Iron Expands Plant

Ingalls Iron Works Co., Birmingham, opened a new office building and an expanded steel fabricating plant at Verona, Pa.

Will Process More Titanium

Crucible Steel Co. of America and its affiliate, Rem-Cru Titanium Inc., have announced a joint $400,000 improvement program to increase titanium processing facilities at Crucible's Park Works, Pittsburgh. Capacity for rolling titanium will be expanded 100 per cent.

Improvements will include the installation of a continuous, double row furnace for heating slabs, erection of a new building to house a bar yard and auxiliary processing equipment, and the remodeling of a sheet mill.

Le Roi To Enlarge Facilities

A $5.5-million engineering and research expansion program has been started by the Le Roi Division of Westinghouse Air Brake Co. at its Milwaukee plant. Funds will be spent within the next five years. Contracts already have been let for $500,000 worth of laboratory facilities. As part of the program, the division recently established a metallurgical section, complete with laboratory facilities. The quality control department is undergoing reorganization, and its facilities are being expanded. The Milwaukee plant produces portable and stationary compressors and internal combustion engines.

American Bosch Dedicates Plant

American Bosch Arma Mississippi Corp., a subsidiary of American Bosch Arma Corp., Garden City, N. Y., dedicated a $1,164,000 addition which more than doubles the size of its Columbus, Miss., plant. It will be used for the manufacture of generators, small electric motors, automotive voltage regulators, electric windshield wipers and related products. The parent company is more than half way through a $1.5-million modernization program at its division in Springfield, Mass., and is seeking more space to facilitate added defense work at its Garden City works.

Briney Mfg. Co. Organized

Formation of a subsidiary, Briney Mfg. Co., Pontiac, Mich., specializing in the manufacture of boring heads, has been announced by Goddard & Goddard Co., Detroit. Officers of the new company are: E. A. Goddard, president; O. R. Briney Jr. and J. W. Briney, vice presidents; and H. C. Henderson, secretary-treasurer.

McNeil Buys Another Firm

Lincoln Engineering Co., St. Louis, maker of lubricating equipment, merged with McNeil Machine & Engineering Co., Akron. The Lincoln property will be operated as a division of McNeil. The McNeil organization, maker of presses, previously acquired Cleveland Crane & Engineering Co., Wickliffe, O., and Hamlin Metal Products Corp., Akron.

Offers Metals at Mill Prices

Eastern Brass & Copper Co., New York, has completed its conversion to a custom mill, selling aluminum, brass and copper coil and strip at mill prices. The firm has withdrawn its distributorship in aluminum to concentrate on the rerolling of strip, "to be accomplished entirely from raw materials supplied by the leading domestic producers of aluminum and brass mill products." Eastern's new facilities include an annealing oven and a 2-high rolling mill. Other facilities include a battery of slitters and shears; flattening, round-edging, design rolling and cut-to-length machinery.

The new pricing program will apply to all the commercial alloys in aluminum, brass and copper, in all gages from 0.005 to 0.125 in. coil and flat stock with slit and round edges. It will permit sales in quantities from 500 lb to carload lots at mill price.

The company will continue to distribute rods, tubing, wire, bus bar and other specialty rolled products.

Federal Machine To Expand

Federal Machine & Welder Co., Warren, O., plans to spend about $750,000 during the next year in increasing its production facilities. Most of the money will be for new machinery.

Vorys To Build Warehouse

Vorys Bros. Inc. will build a warehouse and office building at 834 W. Third St., Columbus, O. The firm is a distributor of copper, brass, stainless steel and aluminum sheet, rod and tube; carbon steel sheets, including cold-rolled, enameling iron, galvanized and specialty steels; and tooling equipment.

REPRESENTATIVES

Norton Co., Worcester, Mass., appointed Rudel Machinery Co. Inc., New York, as a distributor for its precision grinding and lapping machinery. Territory: Eastern New York, northern New Jersey, Connecticut and western Massachusetts.

Boyer-Campbell Co., Detroit, was appointed distributor for sheet steel separators manufactured by **Bass & Co. Inc.**, New York.

United States Ceramic Tile Co.'s Diamonite Products Division, Canton, O., appointed these sales representatives for its Diamonite oxide cutting tools: Wetzel Tool Co., East Hartford, Conn., for Connecticut; Jack E. Dustman & Associates, for Indiana, excepting Lake, Porter, La Porte and St. Joseph counties.

Unimet Carbides, a division of **United Drill & Tool Corp.**, Chicago, appointed Production Service Co., Cleveland, as a distributor of its carbide tools, tips, blanks and inserts.

Middle Atlantic Co., Long Island City, N. Y., will represent **Pennsylvania Salt Mfg. Co.'s** metal processing department, Philadelphia, in the New York metropolitan, Westchester and Long Island areas.

Magnethermic Corp., Youngstown, appointed William K. Stam-

ets Co., Pittsburgh and Cleveland, as representative for its induction heating equipment in northern Ohio, western Pennsylvania and West Virginia.

NEW ADDRESSES

Morgan Aluminum Welding Rod Co., manufacturer of aluminum and magnesium welding rods and electrodes, moved its manufacturing operations from Cleveland to Mt. Carmel, Pa. The company will increase its output by at least 100 per cent. The sales office remains at 840 N. Michigan Ave., Chicago 11, Ill.

Chase Brass & Copper Co. moved its St. Louis warehouse and office to newly erected quarters at 4641 McRee Ave. Louis J. Vogler is district manager.

Copperweld Steel Co.'s Steel Division moved its New York district office to 225 Broadway, New York 7, N. Y. Copperweld Steel International Co. also is at the new address.

Air Reduction Co. Inc. moved its executive offices to 150 E. 42nd St., New York 17, N. Y.

ASSOCIATIONS

Wire Reinforcement Institute, Washington, elected Ivy H. Smith president; M. E. Capouch, vice president. Frank B. Brown is managing director. Mr. Smith is president of a Jacksonville, Fla., company bearing his name. Mr. Capouch is manager of construction material sales, American Steel & Wire Division, United States Steel Corp., with offices in Cleveland.

Roger A. Yoder, vice president, Detroit Steel Corp., Detroit, was elected a vice president of the **Controllers Institute of America**, New York, effective Sept. 1.

Steel Kitchen Cabinet Manufacturers Association, Cleveland, elected R. A. MacNeille, St. Charles Mfg. Co., St. Charles, Ill., president; C. K. Reynolds Jr., Berger Division, Republic Steel Corp., Canton, O., vice president. Arthur J. Tuscany Jr. is executive secretary-treasurer.

E. J. Baker, manager of the Rochester, N. Y., district of the Federated Metals Division, American Smelting & Refining Co., was elected chairman of the Rochester chapter of the **American Foundrymen's Society,** Cleveland. A. J. Murrer, foundry engineer, Gleason Works, Rochester, was elected vice chairman of the chapter; Paul Buschner of the Engineered Castings Division, American Brake Shoe Co., secretary-treasurer.

Dr. W. R. G. Baker, General Electric Co., Syracuse, N. Y., was elected president of the **Radio-Electronics-Television Manufacturers Association,** Washington.

Purchasing Agents Association of New York elected these officers: President, W. F. Rae Jr., Mennen Co.; treasurer, E. B. Fielis; vice presidents, D. S. Gibson, Worthington Corp., and F. S. Romanse, Babcock & Wilcox Corp.

1 Unit... 3 Filtration Processes

• MAGNETIC SEPARATOR
• GRAVITY ATTRACTION
• FILTRATION

Delpark UP-FLO MAGNETIC SEPARATOR AND FILTER

...WITH PERMANENT FILTER SCREEN and 3 COMPLETELY AUTOMATIC CLEANING DEVICES

Combines the new Delpark powerful magnetic separator with a permanent filter media bar stock screen. Swarf bearing liquids flow on top of a large flat magnetic field. Magnetic unit incorporates more Alnico #5 magnets, gives twice the width of field, beings all swarf in suspension within the influence of the magnetic field, puts gravity to work in assisting the magnets and prevents washing and turbidity by using low velocity flow. This feature is particularly desirable on high viscosity fluids.

Three cleaning devices, completely automatic, remove the separated residue from the unit. Chain driven flights remove deposits from the magnetic field and the bar stock screen. .004" bar screen is cleaned by an air shaker device to dislodge enmeshed particles. A drag-out unit is built into the clean coolant tank.

Up-Flo Filters are available without magnetics for non-ferrous metal applications.

See your Delpark representative for more complete information or write.

Delpark FIRST IN FILTRATION ADVANCEMENTS

INDUSTRIAL FILTRATION COMPANY

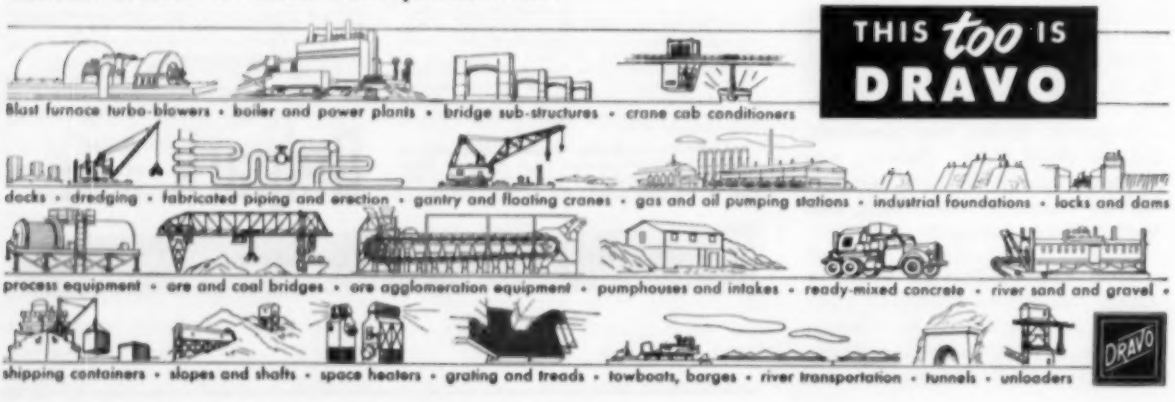
THE CUSTOMER DOUBLED HIS BARGE ORDER

Southern Materials Company, a James River, Virginia, sand and gravel producer had barge problems. The wooden units in their fleet were too easily damaged and required constant repair. Operating, as well as maintenance costs, were rising.

Ten Dravo-built welded steel barges, now in service, are correcting this situation. They are more rugged, move faster and carry bigger payloads. Out-of-service time is reduced.

Before these barges were delivered, Southern Materials ordered ten more. Their president said: "After more than ten years of babying conventional wooden types, these new steel units have changed our entire thinking with regard to barge service and life."

This floating equipment is another example of how Dravo has been serving business and industry for more than 60 years in many engineering fields, with customer satisfaction considered essential in every transaction. For more information write DRAVO CORPORATION, PITTSBURGH 25, PENNA.


THIS too IS DRAVO
Blast furnace turbo-blowers • boiler and power plants • bridge sub-structures • crane cab conditioners
docks • dredging • fabricated piping and erection • gantry and floating cranes • gas and oil pumping stations • industrial foundations • locks and dams
process equipment • ore and coal bridges • ore agglomeration equipment • pumphouses and intakes • ready-mixed concrete • river sand and gravel •
shipping containers • slopes and shafts • space heaters • grating and treads • towboats, barges • river transportation • tunnels • unloaders
DRAVO

Technical Outlook

VERTICAL ASSEMBLY—If you have a short run assembly problem, try a new concept developed by Laboratory for Electronics Inc., Boston. The firm will save $10,000 to $20,000 this year in an 80 man assembly department. A single operator becomes a production line; he performs the first stage of operation on all assemblies before starting the second. Mass production benefits (speed and skill) result when each stage is broken down into a few operations. Each stage is set up on a removable bench top that can be wheeled to the assembly floor.

STEEL FOR ATOMICS—The reactor business needs new and better steels, and it can afford to pay for special steels for some purposes, says R. C. Dalzell of the AEC. Greatest need is for steels of higher yield strength than 304, with adequate corrosion resistance. Endurance limit also is important because structural members inaccessible for maintenance will undergo many thermal cyclings during the lifetime of a reactor. Mr. Dalzell predicts a growing market for stainless and other steels for the outer structure of reactors and for associated chemical plants.

PLASTIC BEARINGS—Combat vehicle turrets may turn on plastic ball bearings as the result of a study by Kaydon Engineering Corp., Muskegon, Mich. Melmac 1077 and Bakelite BM 13080 were tops among plastics tested for load, deflection, shock, chemical resistance and wear. They rolled and wore best in a grooved race. Separators of wire or a waxy plastic such as nylon or Teflon doubled bearing life.

PROTECTION FOR MOLY—Plated or sprayed nickel, chromium and nickel-chromium coatings are the most promising protection for molybdenum in turbine blade applications at 2000°F. That's what Julius J. Harwood, head, Metallurgy Branch, Office of Naval Research, told the American Electroplaters' Society in Washington. He also reported: For simple molybdenum shapes, cladding with nickel or high temperature alloys looks feasible. Above the 2000 to 2400°F range, only ceramics and molybdenum silicide coatings hold any promise. High temperature strength of molybdenum alloys is unequaled by other metals but lack of oxidation resistance above 1000°F is the subject of intensive study.

ANOTHER NOTE ON PLATING—James D. Thomas, General Motors research staff, revealed a method for measuring the leveling ability of plating baths. Bright coatings that level as they plate (smooth out small recesses) are getting top attention in cutting finishing costs. They reduce buffing and polishing, give better appearance.

ALUMINUM PLATING—A new way to electroplate aluminum on steel has been developed at Virginia Polytechnic Institute, Blacksburg, Va. VPI's Nelson F. Murphy predicts that with further development the process will be used to make aluminum cans. The plating bath is a solution of aluminum chloride in a mixture of ether and organic amine.

HOMEMADE ECONOMY—Engineers at Lewyt Corp., the New York vacuum cleaner firm, have come up with a double reaming machine that cuts man-hours on the job by one-third yet triples production. Trimming aluminum elbows for floor nozzles, the reamer takes metal off the inside and edges of the elbow, at the same time drilling a hole for a wand-locking clip.

Metalworking Outlook—p. 27 Market Outlook—p. 97

Transparent templates like this one locate critical and noncritical areas on an x-ray picture. It helps the semiskilled to evaluate a part with a defect. Areas that will be removed by operations like machining or drilling are marked with "X." Defects can be permitted in those areas

X-ray Team Breaks Bottleneck

By E. R. FOOR
Brown Forman Industries, Louisville
D. E. NULK
Thompson Products Inc., Cleveland

PRECISE x-ray testing on a production line can be done with semiskilled help. You need only a handful of skilled radiographers. They serve as supervisors and set standards.

Solar Aircraft Co., Des Moines, Iowa, faced the problem of drastically increasing the x-ray inspection of parts for gas turbine engines. Plans called for 60 radiographers. By training its own help and setting up a production system, Solar got more mileage out of its staff of eight. Result: No additional radiographers were needed. Customer confidence improved. Costs were considerably less than the original estimates.

Plan—The original laboratory x-ray section now includes an experimental and developmental group. The eight radiographers train unskilled personnel, give them technical advice, write quality standards and act as referees for borderline cases.

The job is broken down into three parts: Film reader, operator and utility man. The film reader interprets the x-ray in terms of the specifications the radiographer gives him. The operator handles the x-ray machines and the automatic film processing units. The utility man assists the operators, prepares parts for exposure and identifies areas for x-ray.

New Parts—The mechanics of the system are simple. A new weldment or casting first enters the laboratory. Technicians determine film quality, sensitivity, density, etc. Exposure tables and charts are prepared which show the expected location of all defects.

The first batches of production are processed in the laboratory until the technicians are satisfied that the technique is foolproof. Jigs and fixtures are developed and the part turned over to the production group.

During this initial period, the metallurgist in charge prepares a quality standard. Most weld standards have already been written. Forgings and castings are considered individually. The parts are studied in terms of metallurgy, design, history, machining and final application.

Templates — Written standards are supplemented by transparent templates. When placed over the developed film, they outline the areas where defects can and cannot be permitted.

The time required for specification will depend on the number of parts to be made, intricacy and other metallurgical or design features.

Solar Aircraft is satisfied. Its customers are happy, too: They have reduced their x-ray requirements.

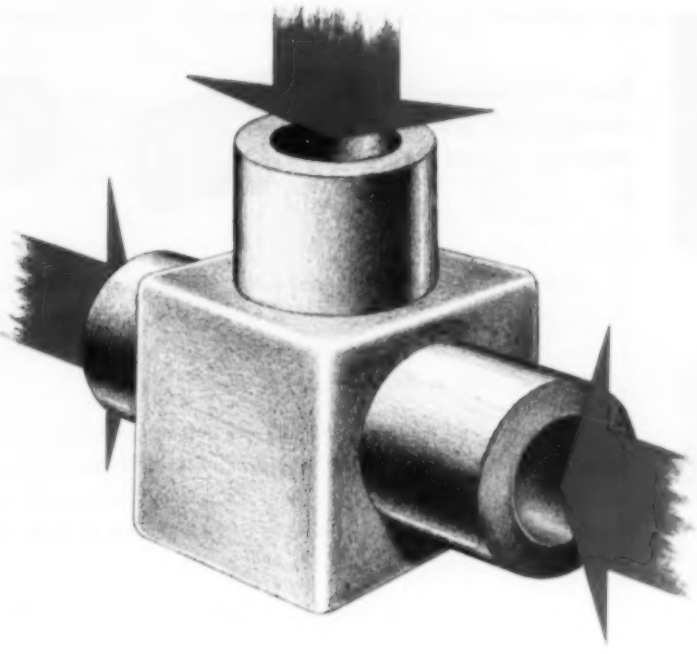
OPERATOR CHECK SHEET FOR MACHINE SETTINGS

PART NAME:_____ PART NUMBER:_____

Issued by the Laboratory_____, 195__

Part Number	No. of Setting	Penetration	Material	Screen	Film	Kilovolts	Milliamps	Time	Focal Distance
A. Spotweld	A1								
B. Rollweld	B1								
C. Fusion weld	C1								
D. Casting	D1								
E. Braze	E1								
F. Flashweld	F1								

Typical check sheet used by a skilled technician to specify inspection data for the semiskilled operator. It's one of the keystones of success



production ideas

NO. 2 IN A SERIES

Holes Forged In

DO THOSE forgings below look unusual? They are cored forgings. The holes are forged at right angles to each other in a one-shot process.

While not uncommon in England, they are produced in quantity here only by National Cored Forgings Co., South Norwalk, Conn., and the Aviation Division of the Weatherhead Co., Antwerp, O. Both use English presses on which punches operate at an angle to the main ram to produce the cores.

It's a Hybrid — Many companies have made forgings around mandrels or pins to produce cavities in line with the press ram. Cavities have also been produced by hot piercing and other secondary operations. Cored forgings makers exclude these; they use the term to describe a hybrid of closed-die forging and extrusion.

English manufacturers have found such a product ideal for specialty brass plumbing fittings, but never went much beyond that. About five years ago, National (now a subsidiary of Bridgeport Brass Co.) installed 16 English presses. Ranging in capacity from 60 to 500 tons, they were used to make copper-base alloy forgings with cores. Among its early successes were brass discharge heads for Kidde fire extinguishing systems and Yale lock cores and cases.

Performance—Such parts have demonstrated the ability to do a better job than many items produced by other methods. Within size and shape limitations imposed by the presses, cored forging can do these things:

1. Make many parts usually produced as sand castings. Advantages: Pressure tightness, no inclusions or voids, clean surfaces and tolerances close enough to eliminate most machining.

2. Make many parts produced by powder metallurgy techniques. Advantages: Elimination of many production steps, plus high strength, a result of controlled grain flow.

3. Make many parts now made as solid die forgings, with holes later produced by machining. Advantages: Holes are largely preformed to minimize machining and

Double handful of production savings

Saving with Cored Forgings

Part: Fire extinguisher discharge head produced by National Cored Forging Co.

Walter Kidde & Co. Inc., Belleville, N. J., realized average savings of 50 per cent. On one item alone—a naval brass discharge head used on its marine, carbon dioxide fire extinguishing equipment—it reported a yearly saving of $10,000 in metal.

Originally, this forging cost $2.92 per unit and weighed 4¾-lb. The cored forging costs $1.78 and weighs only 2¾-lb. In addition, the forging costs 40 per cent less to ship and results in a 25 per cent saving in machining time. Finally, dollars tied up in inventory and the handling of brass scrap are proportionately reduced.

Kidde's initial success resulted in applying the cored technique to more than 30 additional brass fittings. In each case, similar savings were achieved.

associated scrap loss; fatigue points are eliminated by controlled flash and grain flow.

Air Service — Weatherhead acquired its three presses about three years ago. After experiencing excellent results with brass valve bodies, the company swung heavily into aluminum aircraft fittings. The qualities which make these forgings valuable in brass (grain flow following core contour, high density, diecasting accuracy and minimum flash) also make them ideal for aircraft requirements.

One difficulty, fatigue failure, was licked. It has been a problem with some aircraft forgings, the weakest point ordinarily lying in the area of the flash line where grain structure is coarse and not contained. On a conventional forging, flash may be 1/16-in. thick. Buffing is necessary to eliminate fatigue points where flash joins the forging body.

Thin Flash—Because cored forgings are formed by extruding a slug into a closed die, flash seldom runs over 0.015-in. thick. It is too thin to disrupt grain flow.

"On this part," said a Weatherhead engineer, holding up an aluminum T-fitting, "I trimmed the flash with my fingernail." Of course, to get such minimum flash, the slug has to be of a size to exactly fill the die cavity when deformed. (Close control of slug size

Check These for Forgeability

Not every job can be core forged. Size is obviously limited by press capacity, but a lot of other factors have to be considered. Here are some that enter into a successful forging by the Taylor & Challen method.

1. Pressure: A good rough factor to use is 10 tons to the square inch of area, taking into consideration both contour and punches.

2. Flow: Design of the part may have to be modified by increasing radiuses, or decreasing contour area. Restrictions in lines of flow should be eliminated as far as possible. A punch should not restrict flow from a smaller outside diameter to a larger one.

3. Core Dimensions: A compromise must be struck between ideal core dimensions and maximum punch life. Deep, small diameter side cores may result in punch breakage.

4. Economy: Forgings can be too small to be economical. Cost is likely to be greater than savings when cores are smaller than ⅜-in. in diameter, but may be justified by improved performance.

5. Billet size: Both diameter and length of the billet must be closely controlled. Final adjustment of billet size will probably have to be made by trial on the press. It may be necessary to partially upset billets if bar stock of the right diameter is not available. Billets should be sawed to length (sheared ends produce uneven flow and side pressure on the punches).

6. Proportionate cores: As the billets must be displaced to fill the die, cores must be large enough

Part: Aircraft T-fitting, 14 SF aluminum, produced by the Weatherhead Co.

Operation	Core Forging (hours per thousand)	Standard Forging (hours per thousand)	Per Cent Savings or Loss
Sawing	3	20	85
Forging	10½	8	–31
Blocking	0	8	
Trimming	2	2	0
Machining	18	22½	20
Drilling	5	5	0
Brushing	6	6	0
	44½	71½	
Material	Round bar stock	T-shaped extrusion	
Weight of slug	4/5 lb	1-2/5-lb	43

is one of the tricks of the trade.)

Inside — On a conventionally forged T-fitting of aluminum, drilling the holes produced a microscopic saw-tooth edge where the holes met. It was necessary for Weatherhead to radius this potential fatigue point internally, and the operation was costly.

When tested with as few as 66,000 impulse cycles, a forging without this smoothed radius would develop a crack starting from the inside and going straight through in the area of the flash line. This is some 34,000 below the 100,000 cycles called for in Air Force specs.

The first comparable T-fitting which Weatherhead produced by the cored method was subjected to extreme pressure impulse endurance testing. Hole intersections were not radiused, and other machining did not differ from standard practice. This forging reached 225,000 cycles before failure.

Low Scrap—There are plenty of forgings not requiring such strength on which the method will win on machining savings alone. Both external and internal contours can frequently be produced without draft (½-degree draft is recommended for deep cores in aluminum). This means that tolerances can be held close to finished part dimensions.

Savings start with the forging slug, which is simply a piece of round bar stock. To begin with, it costs less than a shaped extrusion or partially upset slug, which might be logical starting points for a conventional forging.

Additional savings result because parts come from the press with contours ideally adapted for automatic chucking. Advantages of low scrap are also reflected in longer tool life, shorter cycle time and lessened chip nuisance.

Imports—The presses are available only from British sources. They come in three types:

The Taylor & Challen of England and the Crain-Donald of Scotland are similar in operation. They have a top punch in the ram, two side punches actuated by ram linkage to short cam actuating cranks and a lower punch actuated by a pitman from the main crank to a lower crank beneath the press bed.

The dies are split type, closed and locked by vise action of the press. The slug is dropped in the top punch hole just before the upset is made by the co-ordinated action of all punches.

Subpress—The Wilkens-Mitchell,

to do the work. Pieces with small, disproportionate cores or large flat surfaces are generally not well suited to the process.

7. Wall thickness: Minimum wall thickness should be 1/10-in. as a general rule (in some cases 3/32-in. will be satisfactory). End sections should not be heavier than wall sections feeding them.

8. Angles: Up to four cores in the same plane can be produced if all coring is at right angles (or 180 degrees) to an adjacent core. Coring at other angles requires a secondary operation. Core centerlines can be offset somewhat.

9. Shapes: Core cross section need not be round. The core may include internal details, and a short section at its end can be of different shape from the main portion of the core.

Where Cored Forging Grows

Lock parts
Hydraulic line fittings
High pressure valves
Radar wave guides
Sink strainers
Plumbing fittings
Aircraft fittings
Hydraulic cylinders
Electronic parts
Specialty hardware
Watch cases

which is a subpress, is sold with a standard forging press, or as an accessory. Dies are of the split type, but in a horizontal position. The slug or blocked forging is placed in the dies and partially upset by the closing action of the dies before the punches enter.

The vertical action of the ram in closing the die lowers the complete unit against cushion pressure which cams in the coring punches.

On all these presses, the side punches operate perpendicularly to the main ram. To produce a core at an angle of other than 90 degrees takes a secondary operation.

Invitation — Why no American pressmaker has come out with core forging equipment puzzles Weatherhead engineers. They point out these limitations of British equipment:

1. **Lack of adjustments:** The presses would be easier to set up if punch movement could be controlled by adjusting the press.

2. **Nonavailability:** Delivery, if equipment is available at all, takes up to two years.

3. **Limited size:** The confined die area and tonnage of the presses available limit the size of parts that can be produced to well below the practical limits of the process.

Dies and Punches — For short runs, die steels of prehardened type may be used. Abrasiveness of forging stock, especially aluminum, may cause excessive wear in runs over 2000 pieces. For such runs, dies should be of tool steels that must be heat treated and ground after sinking the cavity. Die life for copper-base alloy forgings may run to 25,000 units.

Punches are subject to hot working impact fatigue and bending stresses. Only the best steels will do. Punches should be buffed and polished lengthwise to a mirror finish.

Punch design is tricky. Trial and error methods are sometimes necessary to find the combination of length and nose contour that will aid the flow of metal and allow the punch to penetrate to the desired depth.

What Next?—Both Weatherhead and National are well under way in the development of cored titanium forgings. Success with them will open the door to stainless steel, and perhaps other ferrous forgings.

To forge these metals, a constant search for new die materials and lubricants is necessary. Engineers are experimenting with new billet coatings, such as silver plate, aluminum, molten glass and cadmium, in an attempt to procure freer flows with a maximum of die life.

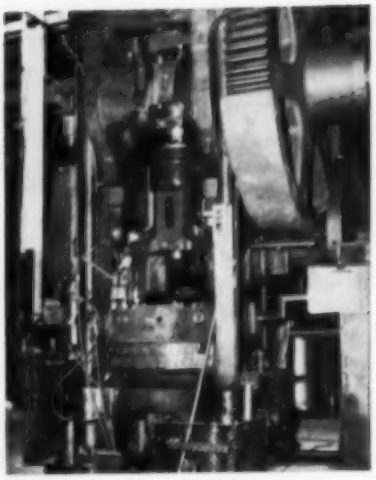
Scovill Mfg. Co., Waterbury, Conn., has been experimenting to the extent of building its own press. Mueller Brass Co., Port Huron, Mich., has one press in operation. At least two Canadian companies are making cored forgings.

1. Taylor & Challen core forging press, Weatherhead Co., Antwerp, O.

2. Die area of Taylor & Challen press, showing linkage between ram and side punches

3. One-half of typical die section in Taylor & Challen press

4. Hot slug about to be inserted in die. After forging stroke, die sections open for part removal



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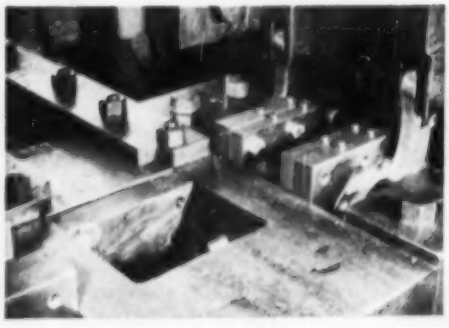

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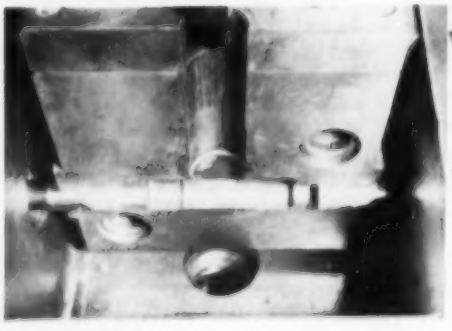

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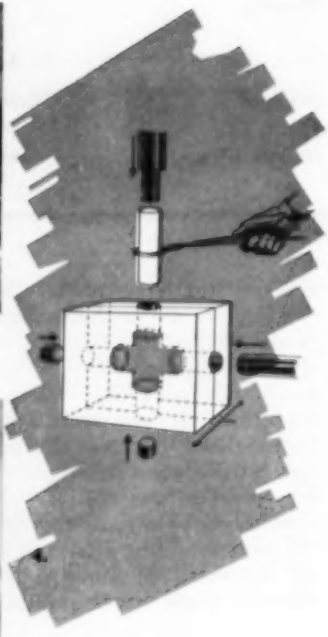

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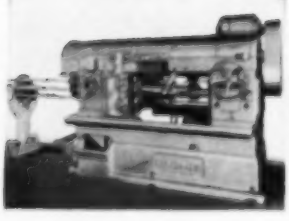

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By VINCENT E. LYSAGHT
American Chain & Cable Co. Inc.
New York

Three examples of microhardness testers: The Tukon, Bergsman and Leitz. This method is best for electroplatings

MICROHARDNESS METHODS — PART II

Hardness Testing

HARDNESS testers discussed in the previous article (STEEL, June 25, p. 98) generally do not give any indication of the hardness of the constituents in an alloy. They are not suitable for measuring the hardness of thin sheets or superficially hardened surfaces. They can't be used to control the hardness of small precision parts.

The microhardness tester will do those jobs.

The Tukon is an example. Loads of 1 gram may be applied although most work requires 100 grams. Two types of diamond indenters are used.

Pyramids—The Knoop diamond indenter is ground to a pyramidal form that produces a diamond shaped indentation under a light load. The Knoop hardness number is obtained from a table. It uses the measured length of the long diagonal.

The other indenter is the 136-degree diamond pyramid type. It is the same as the one used in the Vickers test. Depth of indentation is about one-seventh of the diagonal length. The hardness number (obtained from a table) is the load divided by the surface area of the indentation.

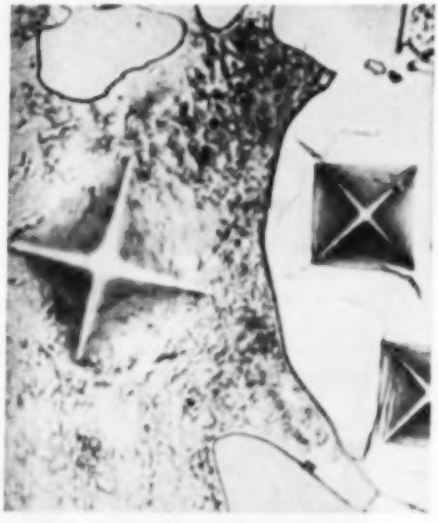
Design — For making indentations in selected small areas, an accurately designed mechanical stage is necessary. The Tukon, for example, has a microscope which will locate an area only a few thousandths of a millimeter square. The specimen is moved under the indenter on the moving plate of the stage, the indentation made and the specimen returned under the microscope.

Others—There are other types of testers. The Bergsman uses an inverted, metallographic microscope. The specimen is attached to a counterbalanced beam, and the applied load placed over the specimen. After the test spot is located, the objective lens is replaced by the diamond indenter. The specimen and load are lowered onto the indenter. After a suitable interval, the specimen is raised, the objective lens replaced and the indentation measured.

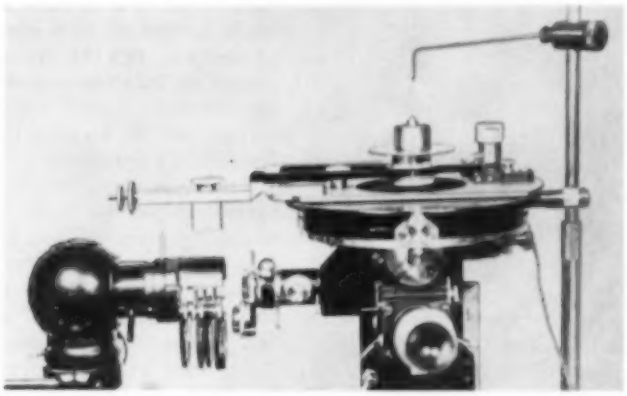
The Leitz has a bench type microscope. The specimen is placed either on the base plate of the microscope stand or a mechanical stage attached to the base plate. The indenter and the objectives are carried in a revolving disc. The test area is selected and the disc turned under the indenter. The indentation is read through a micrometer eyepiece.

Surface—The method of preparing a surface may considerably affect the hardness value. Other factors are the loading speed and the orientation of crystalline planes.

Watch parts and drill rods, for example, are mounted in plastic and polished. Since the size of



The carbides in this specimen of hard (Rc 62), 18-4 steel are badly cracked.



and hard, thin surface coatings. It is also good for determining the limits of decarburization

the indentation can be varied, it is possible to test even the smallest watch part. Instrument pivots, surgical needles and tiny pellets for pen points are among other small parts tested with the Knoop indenter.

Coatings—For many years, shallow, electroplated coatings, hard, thin surface coatings and decarburization investigation have been a challenge. The Knoop indenter has been a great aid in measuring the hardness of electroplates.

One authority reports that a base metal has no effect on the hardness of plating if the plate is of reasonable thickness. He has satisfactorily measured hardness of plates as thin as 0.0005-in. This confirms work done at the National Bureau of Standards.

Production — The microhardness tester is being used for production control of thin metal. One large manufacturer uses it on bimetal and thermostat metals. The largest percentage of the material is nickel and nickel-chromium steels of equal thickness.

Alloys such as brass, stainless steel, chrome iron and silicon bronze are also combined. The metals are bonded in 1 to 2 in. thick slugs and rolled into a 0.003-in. strip. Hardness is an indication of forming qualities and yield point. It is a final check in annealing and reduction. The 136-degree diamond pyramid is used, and the load is varied according to the thickness of the metal.

Operation — Small samples are cut from the strip and supported in a sheet metal clamp. Widths are 0.040 to 4 in. The difference in hardness on each side of the strip may be as much as 100 hardness numbers.

The most serious handicap of the microhardness test is the need for properly prepared samples. They must be lapped flat, be free from scratches and mounted so that the indenter is normal to the testing surface. These requirements mean considerable preparation time. Often, it is necessary to mount the sample. Rounded corners cause inaccurate tests. Be sure to take great care to minimize cold working the surface.

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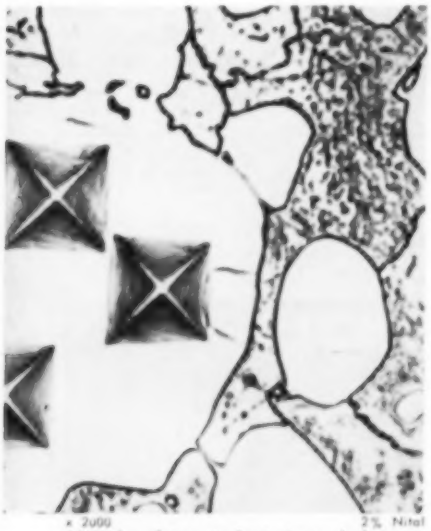

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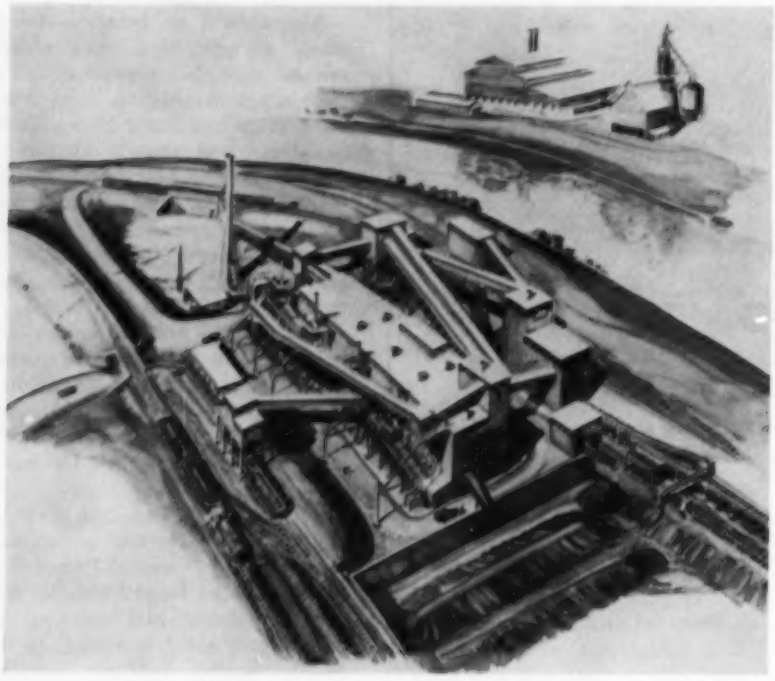
Microhardness indentations help analyze the trouble

These Knoop indentations won't interfere with the usefulness of the gear. Microscopes are used to measure the diagonals



Sintering plant to be built for U. S. Steel Corp. at Youngstown. The sintering machine is located as near ground level as possible to minimize pellet and sinter breakage through handling

Something New in Sintering

PICTURED ABOVE is something so new in sintering it hasn't been built—a plant that the Dwight-Lloyd Division of McDowell Co. Inc., Cleveland, will construct for U. S. Steel Corp. at Youngstown.

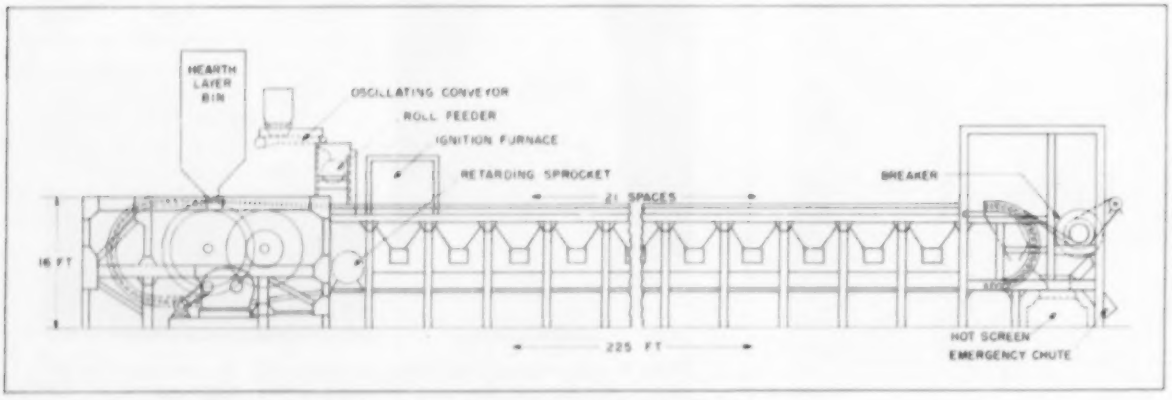
Many details have yet to be announced. For a hint, step inside the Dwight-Lloyd research laboratory.

Up or Down—You would expect to find a sintering machine in such a laboratory. There is one—an unusually versatile machine that can operate with updraft, downdraft or a combination of the two. But the equipment for preparing the sinter mix dominates the scene.

This is in keeping with the Dwight-Lloyd philosophy that quality sinter is not determined by the machine, but by care taken in charge preparation. As Harold E. Rowen, general manager of the division, put it at the spring meeting (at Youngstown) of the Eastern States Blast Furnace & Coke Oven Association: "Improvements in blast furnace practice have shown the importance of beneficiated charge, bringing sintering into prominence. Improvements in sintering will follow the same pattern, using proper blending aggregation and perhaps prechemical treatment of the charge."

Blending—Patrick V. Gallagher, chief engineer, described some of the other Dwight-Lloyd developments at the meeting. One is a belt feeding and weighing device called an ABC's (for "accurate belt conveyor scale") feeder. Banks of these proportion the sinter charge by controlling delivery of raw materials from hoppers to a main collecting belt.

For mixing and balling, Dwight-Lloyd has turned away from pugmills and balling drums to a device called the Ballwell Flying Saucer. It reproduces the turbulent folding action created by a woman beating cake batter in a tilted bowl. It also can produce pellets of uniform size at a constant rate. In



Design for sintering machine to be erected at Ohio Steel Works, U. S. Steel Corp., Youngstown

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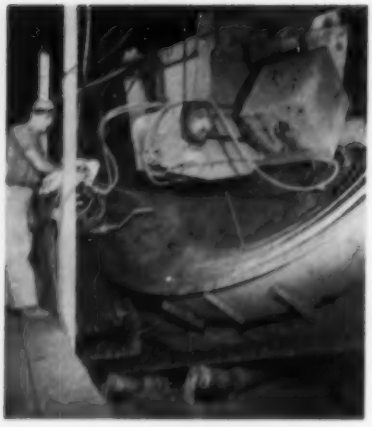


Flying Saucer in action

one installation over 90 per cent fall in the ¾ to ½-in. range.

New Ideas—In U. S. Steel's new Youngstown plant, ABC's-feeders will proportion the sinter ingredients. Flying Saucers will mix them and pelletize the micron-size fraction. Then the mix goes to a sintering machine that incorporates many new ideas.

One is updraft. That was the way sintering started, but machines went to downdraft because updraft blew the bed away. Now, says Mr. Rowen, there is a trend back to updraft through a deep bed laid on a sintered hearth layer.

The hearth layer prevents sinter from sticking to the grate bars. No rapping is needed to dislodge the sinter cake. However, the unretarded movement of pallets around the return sprocket can result in a good deal of unwanted impact.

To prevent this, the new machine will have a retarding sprocket controlled by an eddy current brake. It will hold the pallets together through the sintering and return sections (the pallets are pushed through the cycle).

Deep Bed — Machines Dwight-Lloyd is building today have high pallet side walls for deep bed combustion. A machine installed for one of the ore companies on the Michigan upper peninsula this year operates with a bed depth of 36 in., the deepest to be attempted, says Mr. Gallagher.

It is a big machine, 233 ft long, and the first of the updraft type to be built in this country. Sintering begins with a 4 in. hearth layer of burned pellets placed on the bed at the beginning of the strand. The layer moves under an ignition furnace and over a downdraft zone which brings the layer to incandescence. Then as the pallets move into the updraft zone, oscillating feeders (replacing the traditional swinging spouts) deposit four layers of pellets, each 8 in. thick, on the incandescent bed.

Heat and Cool—The moving bed is timed so that burnthrough of a layer occurs when a layer enters the next feed zone. After the last burnthrough point, updraft air cools the burned pellets. Finish cooling on top of the bed is done by transferring to downdraft in the last two windboxes. Pellets are hand cool at discharge.

Air used in cooling is heated by the sinter to about 400°F. It is collected and used as preheated combustion air, resulting in significant fuel savings.

Air Seal—An updraft machine requires a sealed hood to collect the exhaust gases. Sealing at the edge of the pallets is also necessary to protect operators and maintain airflow. The Dwight-Lloyd machines employ a sliding double-stepped seal which is reputed to keep air leakage to 5 per cent. Pallets slide on this seal, and wheels on the pallets are used for return travel only. An automatic lubrication system keeps seal wear low.

The two-step Rowen seal

Shell Molding

A new machine can make molds for castings up to 34 in. square that weigh up to 720 lb

A SHELL molding machine that can turn out molds 36 in. square has been installed at the Elwood City, Pa., steel foundry of National Tube Division, U. S. Steel Corp.

The machine will produce shell molds for casting seamless mill tools, such as piercer points and guide shoes, as well as multiple molds for smaller items like extrusion dies.

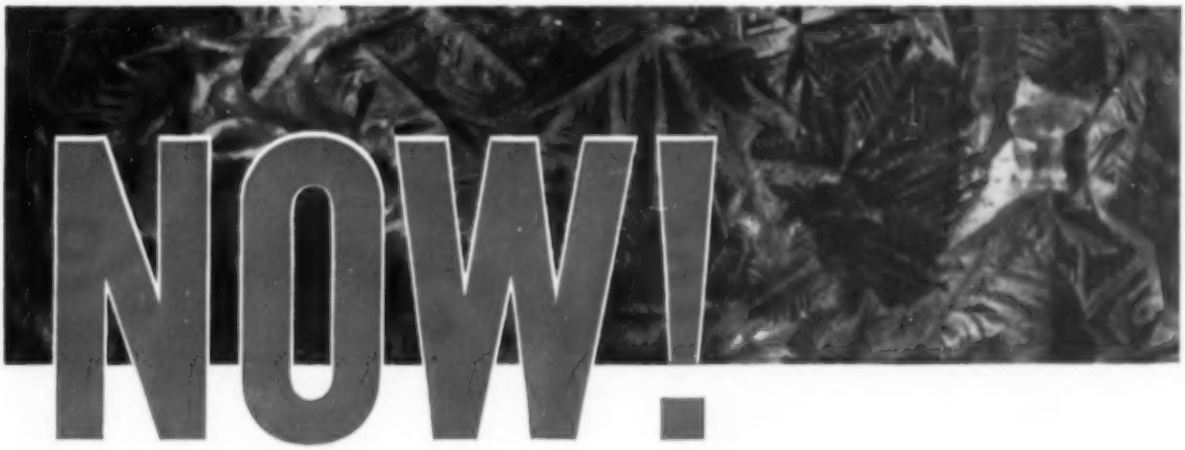
BIG MOLDER
. . . gets final adjustments

Mechanism — Hydraulic motors invert the pattern plates and dump boxes during the investment cycle. The oven is moved between the unit's two stations electrically. Two hydraulically powered plates eject the shells.

The oven and pattern are heated electrically. Contact heaters, thermostatically controlled, nest against the back of the pattern plates, and pass heat to the shell molds. Individual pattern heating avoids inconsistency in the shell molds.

Capacity—Castings up to 34 in. square can be made from the shells. They could weigh as much as 720 lb after gates and runners had been removed.

Built by Shalco Engineering Corp., Connellsville, Pa., the shell molder is 18 ft long and weighs over 4 tons.



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J&L STEEL

Built adjacent to the main plant (upper right), this new foundry will turn out gray iron castings for Bullard machine tools

Bullard Doubles Foundry Capacity

New plant will enable company to retain big casting jobs which it previously had been forced to farm out. Cost of facilities: $7 million. Capacity: 125 tons a day

SEVEN MILLION dollars worth of foundry facilities are turning out castings for Bullard Co., Bridgeport, Conn.

The new foundry cast its first iron during the week of Apr. 30. Bullard executives expect it will be in full production about the end of July. It's designed for 125 tons of melt a day, with a potential of 60 tons more. That is about twice the capacity of the company's old foundry.

Designed for Peak—Capacity was pegged to what Bullard officials considered peak machine tool demand.

In lesser years, the company expects to have capacity available for subcontract work.

Dust Collector — The building is 240 by 600 ft. It measures 56 ft to the ceiling. Finding it almost impossible to vent each operation on the huge castings, engineers made the building one large dust collector.

The ventilating system has an intake and exhaust capacity that will move 512,000 cu ft of air every minute. There is a complete change of air every 15 minutes.

Flow Pattern—The secret of the foundry's efficiency lies in the material handling provisions. Raw materials come in on the railroad siding within the building. Coke, sand and limestone are dumped from hopper cars directly into an unloading station, then moved to storage bins.

Pig iron and steel scrap are unloaded by magnet cranes and dumped into storage bins.

From these bins, iron and steel are loaded into the cupola charging bucket and automatically weighed. The bucket moves along a track where coke and limestone are fed from overhead bins.

Charge—From the loading area, the bucket moves up the inclined track to the charging deck, where it enters the transfer car. This car moves along the charging deck to a preselected cupola; the charging bucket is extended into the cupola; and the charge is dropped.

In pouring, the molten iron runs from the cupola into movable forehearths. The slag drips into a stream of recirculated water and is carried away to an outdoor settling tank. The forehearths permit continuous pouring from the cupolas and can store molten iron between fillings of the pouring ladles.

Sand Travel—Dry sand moves on rubber belts and bucket elevators to several discharge points. One is directly over a large roll-over molding machine. Other chutes fill the hoppers for the two sandslingers. This system also makes black sand for large cores.

A smaller sand system prepares green sand for castings up to 200 lb. These are molded from permanently mounted patterns with a stationary slinger and are rolled onto a 700-ft-long roller conveyor for pouring and cooling. In two shifts, 15 men can turn out 200 molds a day. In the old plant, it took 32 men three shifts to produce only 145.

Baking—Large molds and cores are baked in a battery of gas-fired ovens. They're loaded from the slinger floor. After baking, they are taken out the other end of the ovens and unloaded in the center of the pouring bay.

Copes, drags and cores are assembled into finished molds in the center bay. Pouring ladles are carried by the overhead cranes. Green sand iron is carried by a wall crane (that can pass under the large cranes while they are pouring) to transfer tracks. Iron is moved to the green sand pouring area on these tracks.

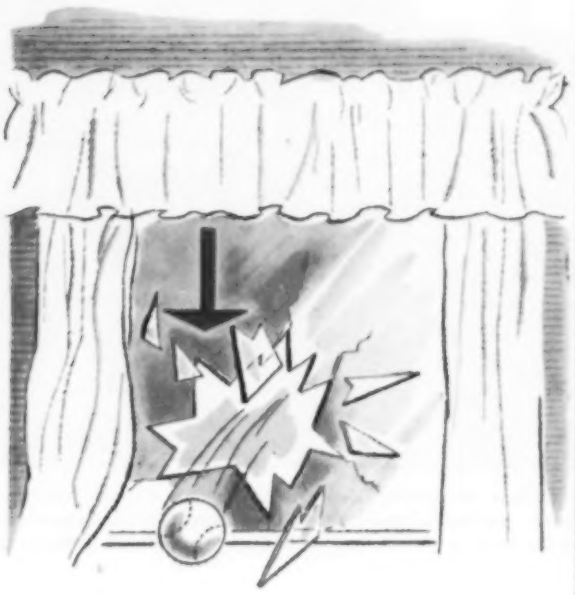
End of Line — After pouring, molds go to shakeout. Sand returns to the sand systems; flasks go to the molding floor or storage; and castings are cleaned in a hydraulic blast room, shot machine or shotblast room.

Large castings then are cleaned, chipped and filled. Small castings are tumbled and shot cleaned and ground, snagged and finished.

Finally, castings go to a paint spray booth and then across the road to the machine shop for fabrication.

Savings—Bullard found that as the size and weight of their machine tools grew, their old foundry was faced with the job of casting ever larger parts. It finally got to the point where all the large castings for the new model 75 machines were being farmed out (about 25 per cent of their casting jobs).

This additional capacity will bring all those jobs back. It will preclude the sometimes whopping freight bill the company paid for large castings. Then, too, Bullard engineers feel their new foundry will enable them to lower the casting costs.



a hole here means work...

a hole here saves work

Crucible Hollow Tool Steel Bars take much of the work out of making ring-shaped steel parts, or tools with a center hole. The hole's already there. You save expensive drilling, boring, cutting-off and rough-facing operations . . . you reduce machine time and scrap losses.

You can now get Crucible Hollow Tool Steel Bars in any of the famous Crucible tool steel grades, in virtually any I.D. and O.D. combination. And you can get *immediate delivery* from stock of the five most useful grades — KETOS oil-hardening . . . SANDERSON water-hardening . . . AIRDI 150 high-carbon, high-chromium . . . AIRKOOL air-hardening . . . NU DIE V hot-work tool steels.

Your Crucible representative can quickly show you how Crucible Hollow Tool Steel Bars will save you work and money. *Crucible Steel Company of America, The Oliver Building, Mellon Square, Pittsburgh 22, Pa.*

CRUCIBLE first name in special purpose steels

Crucible Steel Company of America

No. 5, Part II, in STEEL's Modern Brazing Series

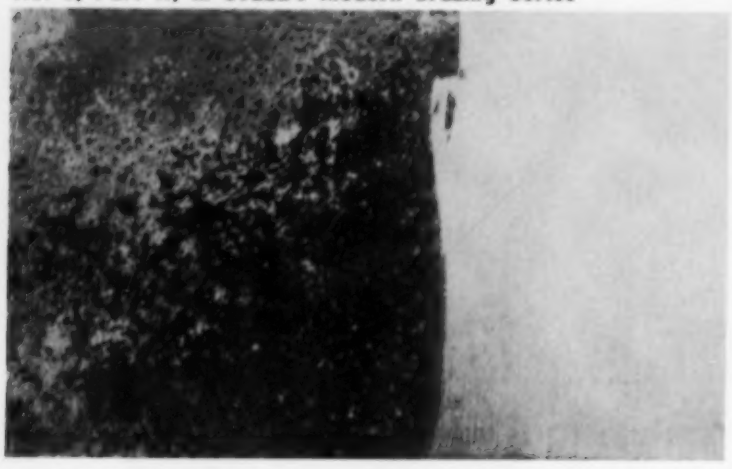


Fig. 1—Half of this copper strip was coated with flux, the other half left uncoated, and the strip heated to 1100°F. Note the heavy oxide coating on the unprotected section. The strip was photographed after a water rinse

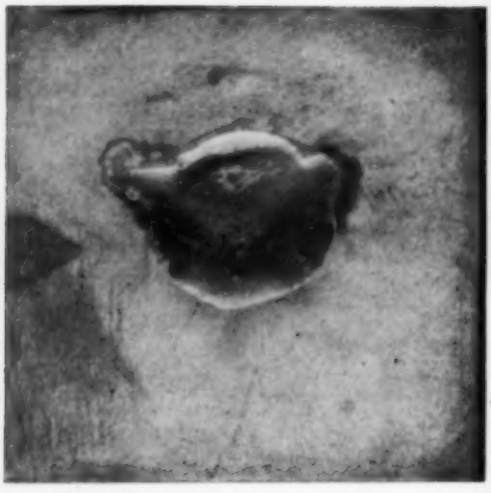


Fig. 2—Fluxing ability of a poor and good flux as measured by the area covered by equal amounts of silver

The Why of Flux

By A. M. SETAPEN
Manager, Engineering Division

and

E. S. CHAMER
Metallurgist

Handy & Harman
New York

PROPER FLUXING is basic to good silver brazing. Flux must always be used when brazing in air; in a reducing atmosphere or vacuum, it is not required.

Flux has two functions: 1. To remove oxides on the metals to be brazed. 2. To prevent oxidation.

Flux Action—Oxides inhibit the ability of the brazing alloy to "wet" the metal, prevent it from penetrating the joint area uniformly and reduce the adhesion of the alloy-metal bond. Oxides frequently cause a mechanically weak and leak-prone joint.

Flux dissolves metal oxides and forms molten solutions that are like low melting glasses. It blankets the surface with a relatively airtight film. Fig. 1 illustrates the protective action of flux on a strip of metal that has been heated to brazing temperature, about 1100°F.

Formula—A flux is compounded to achieve a careful balance of properties. It must be sufficiently

Properties of General Purpose Flux

Fluxing ability with a wide range of metals: A general-purpose flux will dissolve the oxides of copper, brass, bronze, nickel, Monel, carbon and stainless steels. Certain alloys, particularly those whose oxides are refractory, require special fluxes. Some have been developed for aluminum-bronze, titanium, molybdenum, chromium-carbide and other high chromium steels and certain Stellites. One fairly accurate indication of comparative flux ability is the area which a given quantity of brazing alloy will cover under fixed test conditions (see Fig. 2).

Melting temperature: The flux should be completely fluid at a temperature well below the flow point of the lowest melting brazing alloys, about 1145°F, to protect the metal while parts are being brought up to brazing temperature. One general-purpose flux melts in the 600 to 800°F range and is completely liquid and active between 1050 and 1100°F. Changes of state and appearance of flux at different temperatures are valuable guides that tell the operator when to begin brazing. Another important property: The flux should melt down in place without excessive bubbling and puffing, which would displace the molten film and expose bare metal.

Flux life: Any flux, if heated long enough or hot enough in air on an oxidizable metal, will become saturated with oxide and lose its fluxing properties. If the flux becomes spent before the parts are completely brazed, poor joints result and the residue is difficult to remove. The problem in flux formulation is to arrive at a suitable compromise between melting point and activity, and flux life and stability

brazing alloy heated to brazing temperature. Metal was pickled and cleaned before photographing

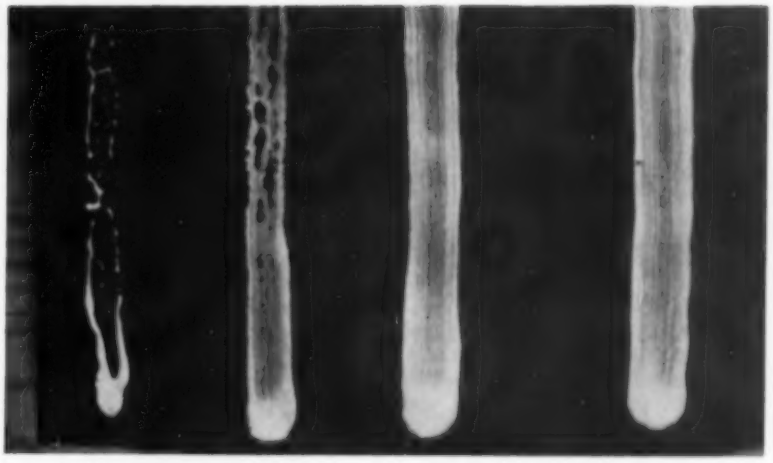


Fig. 4—Wetting action of flux. The two stripes of flux at left show poor wettability; the two at right, good wettability. A poor wetting flux cannot do its job properly and will result in an unsound joint

versatile, chemically, to combine with the oxides of many metals. But its activity must be "paced" so it will have the reserve capacity to absorb the oxides that form during brazing.

It must be sufficiently viscous to provide good adhesion to the metal surface, and form a relatively air-tight film, but it must be able to be displaced readily by the brazing alloy flowing into the joint.

Versatile—Makers of flux and brazing alloys have formulated general-purpose fluxes that can accommodate more than 95 per cent of all applications. In certain situations, special fluxes are required, but they should be used only when a general-purpose type is known to be unsuitable.

Composition — General - purpose flux for silver alloy brazing consists of 2.6 parts of potassium, 1 part boron and 1.8 parts of fluorides. Sodium content is 0.1 per cent maximum to avoid sodium glare in the brazing torch.

This composition may be arrived at by various combinations of compounds, such as potassium oxide, potassium fluoride, potassium bifluoride, various potassium borates, potassium borofluoride and boric acid.

Blending—The compounds used, and the ratio in which they are blended, have an important effect on the performance of the flux. Such properties as consistency, stability, hot adhesion and tendency toward crystallization are affected by the blending of compounds.

A meaningful specification for flux cannot be based on chemical composition alone, it must also include an elaboration of the physi-

---

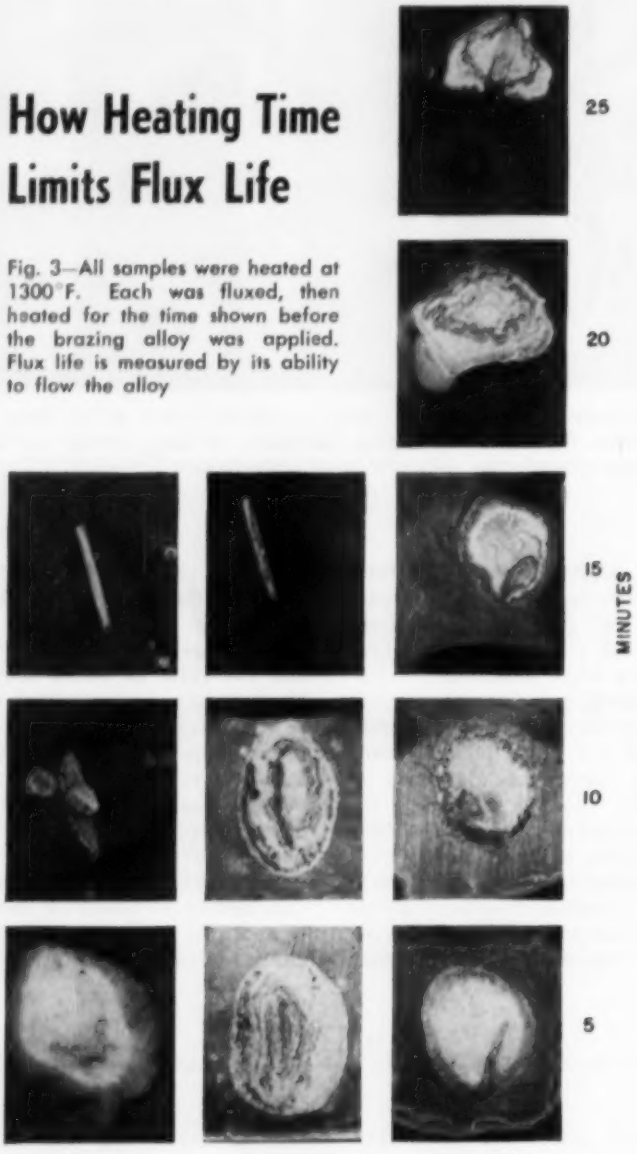
at high temperature. Low melting compounds are extremely active, but are too short lived to be useful. As the process temperature rises or the heating cycle becomes longer, it is necessary to modify the compound so the flux is somewhat viscous at its fluid temperature. Such fluxes resist running off and being spent rapidly, but are somewhat sluggish and have a higher melting point. Fig. 3 (page 82) illustrates the effect of heating time on flux life and on its ability to flow the alloy.

Adhesion: When flux is applied to a vertical surface and heated, some varieties may run off and expose bare metal while the water is being evaporated. This may or may not affect the quality of the joint, but the resulting oxidation of the exposed metal will make cleanup and finishing more difficult and expensive. Poor adhesion and runoff difficulty are more likely with those alkali-fluoride-borate fluxes which generally resist crystallization under any conditions. Under certain conditions, such as widely varying temperatures, a good, general-purpose flux may crystallize during storage. This tendency has been minimized by modifying formulations short of impairing good hot adhesion characteristics. In any case, crystallization can be corrected by heating the flux at about 175°F.

Wettability: A flux should readily wet and adhere to a metal surface without gathering in islands, even though the surface may be slightly oily. However, this property is no substitute for proper degreasing of parts before brazing. Fig. 4 illustrates poor and good wetting action of flux.

How Heating Time Limits Flux Life

Fig. 3—All samples were heated at 1300°F. Each was fluxed, then heated for the time shown before the brazing alloy was applied. Flux life is measured by its ability to flow the alloy



Short Life
Flux inactive at 10 min.

General Purpose
Flux inactive at 15 min.

Long Life
Flux active after 25 min.

cal properties required.

Cleaning—Flux is not intended as a general cleaning agent. Before fluxing, metal surfaces should be cleaned by degreasing, and any oxide present removed by grinding or pickling.

A polished surface is more difficult to wet with flux than a dull one. A buffed surface, even though fairly clean, is difficult to wet unless flux is specially formulated.

Consistency—Flux paste should be tailored for the type parts being brazed and the method of application. If flux is to be brushed on, the paste should have the consistency of heavy cream if the parts are copper, brass or ordinary steel of moderate thickness.

For all types of stainless steel, the flux should be used in a fairly thick paste. This is to assure sufficient flux to withstand the tendency of stainless toward local overheating and to handle the somewhat refractory oxides formed.

Other Factors—Time and temperature also dictate optimum consistency. When brazing large or heavy parts, which require a long heating cycle, the flux should be quite thick, regardless of the metal. This will take care of the oxides formed during the lengthy heating interval.

If a coating is too thick, the excess does no damage and can be removed during cleanup. If the coating is too thin, the flux is likely to pull away from the surface when heated and permit oxidation of the metal, which prevents adhesion of the brazing alloy.

Protects Joints—One of the causes of oxidation during heating is the air which gets into the joint area under the edges of the flux coating as it bubbles.

The flux coating should extend beyond the joint seam to seal it and prevent migration of oxides from adjoining heating areas. In this way, leaks or low-strength joints frequently can be avoided.

Step Brazing—Flux can be used to protect metal whose surface must be kept oxide free for later fabrication steps.

Example: If two areas of the same piece must be brazed in separate steps, the area to be brazed last can be protected from oxidation during the first brazing operation by a coating of flux. This precaution could save an extra cleanup step.

Fluxed Area—Generally, both pieces being brazed should be fluxed, particularly at their mating surfaces.

If a flux-clean joint is required in a lap joint assembly of two tubes, only the surface of the inner tube should be fluxed, leaving the first inch or so bare.

When pieces are assembled, ex-

Uniformity...

dip-joint construction speeded with accurately sized Armstrong Brick

All seven types of Armstrong Insulating Fire Brick are made slightly oversize and then machined down to specific dimensions with a maximum allowable tolerance of 1/32". This permits fast, accurate wall construction with dipped or thin trowelled mortar joints. Even if the brick are laid up dry, uniformity of size assures heat-tight joints.

Send for free booklet giving complete information on the entire line of Armstrong Insulating Refractories. Write Armstrong Cork Company, 2707 Reed Avenue, Lancaster, Pa. For expert help the next time you have a refractory problem, call in your Armstrong engineer.

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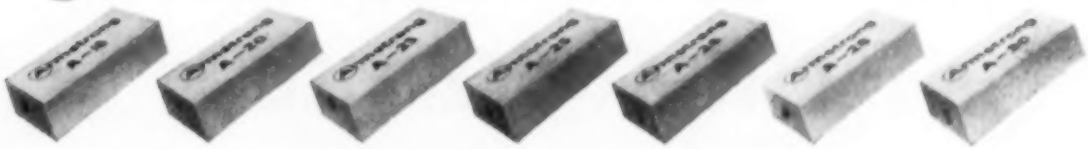

Granite City saves fuel, raises production and quality with Cities Service Heat Prover!

Nation's 14th largest steel producer uses Heat Prover on soaking pits, open hearth furnaces and on their annealing furnaces.

Granite City Steel burns enough fuel in one year to heat a five-room house for 38,000 years!

Obviously, if this fuel burns inefficiently, the loss could be staggering. But Granite City has no worries on that score. "Thanks to the portable Cities Service Heat Prover, we get better fuel efficiency, better quality, greater production than ever," they report.

"Because it provides a quick, highly accurate check of fuel-air ratio, the Heat Prover has proved invaluable in controlling combustion conditions in open hearth furnaces, soaking pits, and annealing and normalizing furnaces. In a matter of seconds it tells our engineers how efficiently the furnaces are working—whereas former tests often took hours and didn't provide as accurate a picture. Anyone in this business can probably benefit from this ingenious device."

Supplied and maintained free by Cities Service, the remarkable Heat Prover is today used and applauded by scores of major steel producers. If you'd like to learn how it could simplify your operation as it has theirs, talk with your local Cities Service Lubrication Engineer. Or write: Cities Service Oil Company, Sixty Wall Tower, New York 5, N. Y.

20TH CENTURY BLOWGUN—a bazooka—is readied by technicians for tapping open hearths. They are part of Granite City's 4800 skilled employees.

HEAT PROVER AT WORK at back of open hearth furnace. In minutes it provides accurate check on furnace efficiency—saves hours required by former testing.

CONTROL TOWER at blooming mill guides ingots as they pass through rollers. Granite City has capacity of 1,200,000 net tons of ingots annually.

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cess flux tends to be pushed back out of the joint. Forward creep during heating occurs in the area left bare. This technique results in a clean, flux-free edge on the interior tube wall.

Inclusions—Some flux tends to remain in the joint after the alloy has flowed into the area. In most applications, these inclusions are of no consequence.

Where necessary for certain critical applications, inclusions can be minimized by moving the brazed pieces slightly while the alloy is still molten. This is known as wiping the joints. One method is to slide or rotate the joint faces against each other. If this is impractical, the piece can be vibrated or jarred slightly.

Saturation — Large joint areas retain more flux than small ones. Also, flux will be retained in joints whose clearances are large. With large areas, use a sparing amount of flux inside the joint to minimize inclusion, but put a heavy coating along the joint edges to seal off the interior of the joint and prevent entrance of air that would hasten saturation of the flux.

Flux that has become saturated with oxide will tend to remain in the joint. Rapid heating will give flux less time to become saturated and make a cleaner joint.

Temperature Guide—The change in the appearance of flux while parts are being brought to brazing temperature helps the operator "see" the temperature of the work:

1. Water boils off at 212°F. 2. Flux whitens, becomes slightly puffy at 600°F. 3. Flux wets surface, appears milky at 800°F. 4. Flux is completely liquid and clear at 1100°F.

Since most low temperature brazing alloys melt between 1100 and 1200°F, the operator can begin to apply the brazing alloy a few seconds after the flux becomes clear and completely liquid.

Part III of this article (July 9) will describe methods of applying flux.

• *An extra copy of this article is available until supply is exhausted. Write Editorial Service, STEEL, Penton Bldg., Cleveland 13, O.*

Properties of Special Fluxes

Aluminum-bronze alloys: The oxide formed on aluminum-bronze is refractory and difficult to dissolve. A special aluminum-bronze flux containing a heavy metal chloride salt will flux this oxide and permit brazing to both ferrous and nonferrous metals.

Long heating cycle: If heating cycles are unusually long—as when brazing in a furnace or when heavy parts, which heat and cool slowly, are involved—a general-purpose flux may be spent prematurely. For these applications, a flux containing less fluoride then the general-purpose flux is available. This flux will have a higher melting point and a higher viscosity, and will be less active and longer lived. This type flux also may be required for induction heating setups where you have localized overheating in the joint area.

High brazing temperatures: When brazing temperatures exceed 1600°F for an appreciable time, such as with the silver-manganese brazing alloys (flow point 1780°F), the flux must have high temperature resistance. This special flux has a low fluoride content and will be somewhat difficult to remove after brazing.

Refractory oxides: When brazing certain refractory alloys, particularly those whose oxides are acidic or amphoteric (can act as an acid or base), the addition of 5 to 10 per cent potassium hydroxide to general-purpose flux will facilitate fluxing. This is recommended for high chromium alloys, and molybdenum and tungsten steels. The addition of caustic raises the melting point of the flux and causes it to harden in the jar on standing. The flux can be softened easily by heating to 175°F.

Chromium-carbide: The growing popularity of cemented chromium-carbide tool tips has led to the development of special alloys and fluxes for attaching these tips to tool shanks. The addition of 1 per cent finely ground, metallic silicon or boron to general-purpose flux gives good fluxing for such materials.

Titanium: The oxide film always present must be dissolved and the underlying metal protected from further oxidation. The metal must be protected from nitrogen and hydrogen which cause embrittlement of the brazed joint. The special flux formulated for titanium brazing is fluid at 1185°F. It may be used in brazing zirconium, tantalum and other refractory metals.

FOR LOW COST HANDLING OF HEAVY MATERIALS IN QUANTITY WITH

magnet | **hook or** | **bucket**

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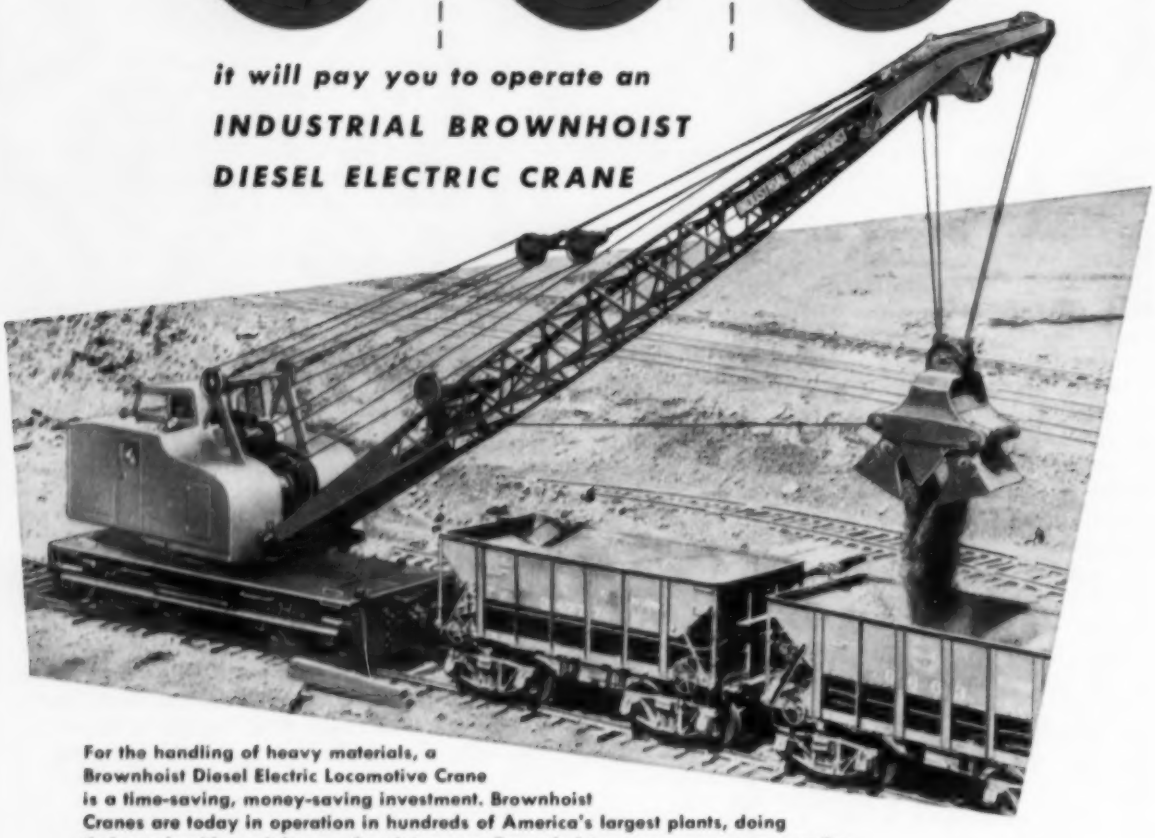
INDUSTRIAL BROWNHOIST
DIESEL ELECTRIC CRANE



For the handling of heavy materials, a Brownhoist Diesel Electric Locomotive Crane is a time-saving, money-saving investment. Brownhoist Cranes are today in operation in hundreds of America's largest plants, doing their work with a minimum of maintenance. Brownhoist cranes can save money by doubling as switch engines. They haul up to 7 or 8 loaded cars on straight and level track. All Brownhoist machines possess the famous Straight Line Power Train, which means you get the smoothest and most efficient crane operation. Brownhoist cranes give your operator greater visibility through the patented Monitor Type Cab and Clear Vision Boom, allowing him to work faster and with more safety. Electric swing available at extra cost on all models. Industrial Brownhoist Diesel Electric Locomotive Cranes are available in capacities from 25 to 100 tons. Write for Catalog No. 548.

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Horizontal Spindle Surface Grinder Features Waist-Level Controls

The Abrasive 618 is a 6 x 18 x 12 in. capacity grinder for precision work.

All feeds are by hand. The elevating handwheel is graduated in 0.0001-in. and has an adjustable reference point. One revolution of the wheel moves the head 0.050-in.

The crossfeed handwheel is graduated in 0.001-in. and has an adjustable vernier for readings to 0.0001-in. One revolution of this wheel moves the saddle ¼-in. Feed controls can be specified in either right or left-hand position.

One revolution of the table feed wheel moves the table 6 in. The chance for getting chatter marks or vibration transfer to the work is reduced because the table rides on antifriction rollers and has a smooth cable and drum drive.

The motorized antifriction spindle is totally enclosed and has lifetime sealed lubrication. The grinder can be equipped with a 12-in. grinding wheel powered by a 2 hp, 1750 rpm motor or a 7 in. wheel with a 1 hp, 3450 rpm motor.

The saddle is a close grained, stress relieved casting 5 in. thick. It will not distort or warp at 50 per cent overload. Saddle ways are widely spaced. *Write*: Abrasive Machine Tool Co., Dexter Rd., East Providence 14, R. I. *Phone*: 1-0549

Ring and Circle Shear Has Floating Arm for Greater Accuracy

Commercially perfect circles can be made by the 31-RC shear. Its self-compensating circle arm floats on guided ways to maintain the true center automatically. Adjustments for variations in thickness of material, overlap of cutters and diameter of the circle are eliminated.

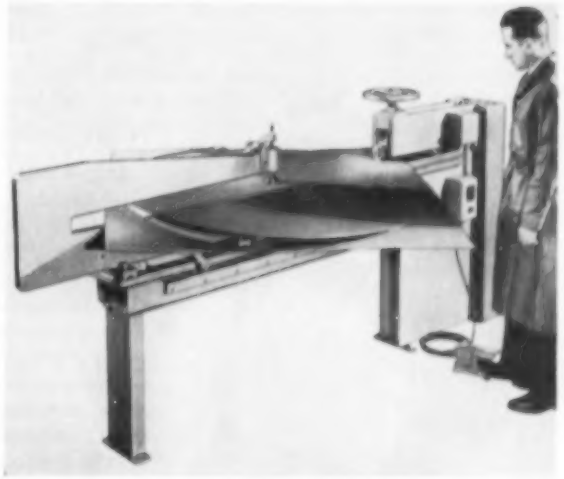
A scale provides convenient setup, and an adjustable crank allows quick positioning of the circle arm to cut circles of various diameters. The center clamp of the circle arm adjusts to hold varying thicknesses of material securely at all times.

The shear cuts both straight line work and irregular outlines (not requiring sharp curvatures), as well as circles, circular holes and rings.

Circles from 6 to 78 in. in diameter can be cut from 10 gage mild steel.

A convenient handwheel makes it easy to raise and lower the upper cutter. This permits cutting to be started at any point on the blank.

High carbon, high chrome steel cutters give clean, fast cuts. An adjustable, swinging gage centers unmarked blanks. An adjustable slitting gage that has a replaceable steel face is furnished for straight slitting. *Write*: Niagara Machine & Tool Works, 683 Northland Ave., Buffalo 11, N. Y. *Phone*: Taylor 4070



NEW PRODUCTS and equipment

Engine Lathe

Speed and load indicators on the headstock of Niles Model 72-A enable the operator to load the machine to capacity without danger of overloading.

A load indicator in the tailstock quill saves time in setup and prevents damage to centers. Operation is controlled from a pushbutton panel at the carriage station.

The main drive is a 100-hp, direct-current motor. The faceplate diameter is 72 in. Swing over the bed and carriage wings is 73½-in.; over the carriage bridge, it is 56 in.

Distance between centers is 46 ft, but can be made to suit customer specifications. *Write*: Baldwin-Lima-Hamilton Corp., Hamilton, O. *Phone*: 4-6511

Batteries

New grid alloys and other improvements are expected to extend the life of batteries for stationary power up to 10 per cent.

The positive grids are an alloy of lead, silver and other metals which resist corrosion and withstand overcharging. The transparent containers are made of polystyrene.

Improved design provides greater space between the plates and the top and bottom of the jar and increases electrolyte volume. In normal float service, it is necessary to add water only about once a year.

Battery capacities: From 10 to 1064 amp-hr. *Write*: Department T, Exide Industrial Division, Electric Storage Battery Co., Box 8109, Philadelphia 1, Pa. *Phone*: Locust 4-4030

Dock Plates

One man can handle high strength magnesium alloy dock plates.

They come in nine standard sizes: From 3 to 6 ft wide and from 2 to 4 ft long. Axle load ratings are from 1800 to 4800 lb.

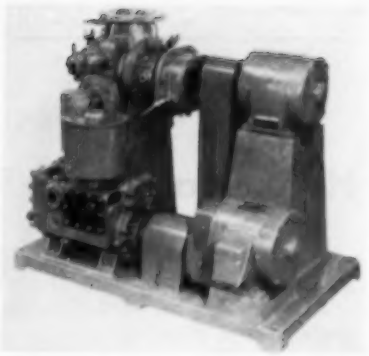
Positive position stops securely lock the board in place between the dock and carrier. *Write*: Magline Inc., 1900 Mercer St., Pinconning, Mich.

High Vacuum Pump

Model KMB-230 is a two-stage mechanical booster pump which maintains uniformly high pumping speeds over a wide range of pressures. A baffled interstage connection is between the two pumps. Both pumps and motors are mounted on a common base.

The unit operates automatically from atmospheric pressure down to 0.1 micron. A pumping speed of 150 cfm is maintained from 200 to 3 microns. At 0.1 microns, pumping speed is 95 cfm.

It is especially suited for vacuum furnaces because it continues



to pump with positive displacement at a pressure greatly exceeding the stalling pressure of oil booster pumps or oil vapor ejectors. Clean pumping action results from the absence of sealing fluid in the lobe rotor unit. *Write*: Kinney Mfg. Division, New York Air Brake Co., Boston, Mass. *Phone*: Jamaica 4-3220

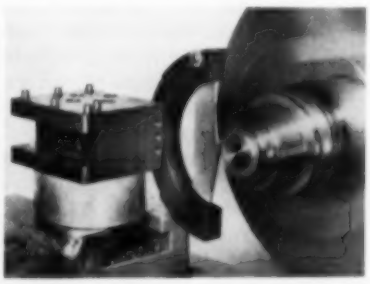
Ceramic Cutting Tools

Keramik has a ceramic tip bonded to a steel shank. Standard size is ½ x ½ x 3½-in., with a lead angle of 7 degrees. The tip is an oxide-base ceramic.

Cutting oils are not needed. The cutting tip runs cool, and chips will not weld to it When properly ground, the tool produces a finish comparable to a commercial grind. *Write*: L. C. Chappel & Co., 1137 Post Rd., Fairfield, Conn. *Phone*: Clearwater 9-3319

Cutoff Assembly

The Speedway offers threefold savings: Time, blade replacement costs and power.



The construction of this cut-off tool eliminates the overhang problem because the cutting edge is supported by tension. This permits the use of a much thinner blade (in relation to depth of cut) than

is conventionally required.

The vertically hung blade eliminates tool chatter and creates less heat. It is stable on interrupted cuts and is suited for work on blanks of all kinds. Blades and holders are available for cuts up to 4½-in. The assembly is easily adaptable to automatic, turret and engine lathes. *Write*: Wye-Stanley Tool Co., 3503 E. Olympic Blvd., Los Angeles 23, Calif.

Press Lubrication

The Clear-Flo system automatically supplies clean, circulating oil to every part of the press.

Metering devices (inserts resembling large and exaggerated screw threads) control the flow of oil accurately and safely. The oil spirals through the metering block around the insert on its way to the lubrication point.

At no point in the circuit is the oil passage reduced to less than the area of a 5/32-in. tube. The principle: Less oil will pass through a long screw than a short one because of the friction between the oil and the screw. *Write*: Clearing Machine Co., division of U. S. Industries Inc., 6499 W. 65th St., Chicago 38, Ill. *Phone*: Portsmouth 7-8700

Combustion Tube Furnace

Model CF-4SA is a 4 kilowatt, electric resistance furnace. It holds one combustion tube up to 5 in. OD. Top temperature is 2750°F.

It can be modified easily for use as a high temperature pot furnace or a constant temperature source for optical calibrations.

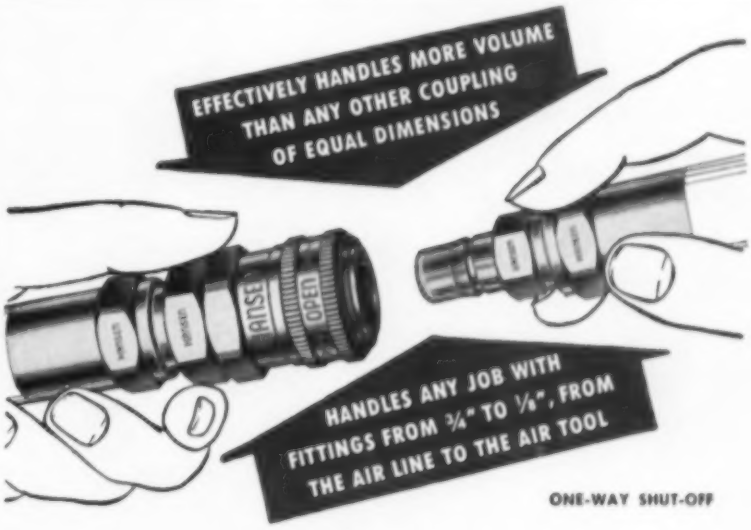
Heat is supplied by eight silicon-carbide heating elements.

The large tube allows the furnace to be used for production runs of small parts. A water-jacketed Inconel tube assembly is available for heat treating applications up to 2150°F, using protective atmospheres. *Write*: Lindberg Engineering Co., 2450 W. Hubbard St., Chicago 12, Ill. *Phone*: Monroe 6-3443

Suction Pyrometer

Gases with temperatures of 0 to 2900°F are measured by the Land suction pyrometer. They are forced past the temperature sensing elements at high velocity. This increases the convective heat transfer from the gas. Concentric shields protect elements from external influences.

The main unit consists of a water-cooled stainless steel jacket which is supplied in 4 to 12 ft


EFFECTIVELY HANDLES MORE VOLUME THAN ANY OTHER COUPLING OF EQUAL DIMENSIONS
HANDLES ANY JOB WITH FITTINGS FROM ¾" TO ⅛", FROM THE AIR LINE TO THE AIR TOOL
ONE-WAY SHUT-OFF

HANSEN Series 3-RL
RING-LOCK COUPLING

Smaller—lighter—compactly designed, the Hansen Series 3-RL Coupling *effectively* handles far more volume than any coupling of equal dimensions. On any job requiring ¾" to ⅛" connections—from the air line to the air tool—this single size Hansen Ring-Lock Coupling—with completely interchangeable Sockets and Plugs—does it all—makes it easy to keep stock of parts in balance—holds inventories to a minimum.

To connect, merely push Plug into Socket. To disconnect just turn the sleeve. Locking ring provides positive lock and assures tight fit. Sockets with aluminum bodies are available for use with small hand-operated air tools.

Write for Descriptive Literature

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THE HANSEN MANUFACTURING COMPANY
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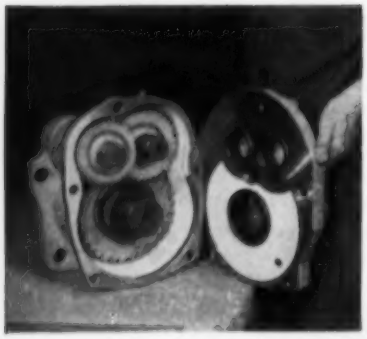
TRACK PINS AND DEAD AXLE SHAFT are subject to heavy stress and strain when the Oliver "OC-18" Industrial Crawler Tractor goes into action. Republic Cold Finished Steels at these vital points absorb shocks and wear of the most rugged service . . . help maintain Oliver's reputation for dependable performance plus economy of operation. Inset shows "OC-18" hard at work on Ohio Turnpike construction.



GEARS TRANSMIT POWER with maximum dependability when designed to make full use of Republic Alloy Steel's excellent physical properties. Formulated to provide great strength, toughness and wear resistance, Republic Alloy Steels allow bulk-free designs requiring less power to start and stop. Republic Metallurgists can help you apply these steels to your product. Mail coupon for full information.

LARGE TONNAGE, LOW WEIGHT are cost-saving features of this new Stainless Steel Volume Van. High strength-to-weight ratio of stainless allows thinner lighter sections with no loss of strength or safety. Result: 35% extra payload capacity. Republic ENDURO® Stainless Steel also offers exceptional abrasion and corrosion-resistance — best choice for long-term beauty plus low maintenance.

REPUBLIC

REPUBLIC STEEL

World's Widest Range of Standard Steels

IN TRACK PINS AND DEAD AXLE SHAFT

Republic Cold Finished Steel transmits 17 tons of driving power

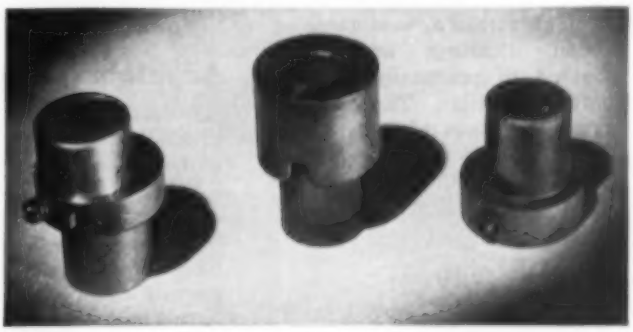
When the mighty Oliver "OC-18" Crawler Tractor leans into a clay bank under full power, king-size forces are exerted against the dead axle shaft and track pins. That's why the Oliver Corporation specifies Republic Cold Finished Steel for these vital parts in the 21-ton giant of their line.

Enormous push and pull strains and shocks are normal in the rugged service the "OC-18" is built to deliver. To protect final drive assembly from undue abuse, a four-inch Republic Cold Finished Alloy Steel Bar is used for the dead axle shaft. Combining extremely high strength and toughness, plus outstanding abrasion and corrosion-resistance, Republic Alloy Bars are more than a match for the tremendous forces involved.

Equal dependability for "OC-18" track pins, is provided by Republic Cold Finished Carbon Corrected Steel. Years of service on other Oliver models have proved this material exceptionally resistant to fatigue failure. In addition, maximum service life is assured by Republic's consistent quality . . . the basis for uniform surface hardness in each pin.

In countless other industrial applications, Republic Cold Finished Steel maintains superior standards of performance. Ultimate strength, yield point and hardness of any given steel analysis show marked improvement after cold drawing. Also, production economies can often be effected by taking advantage of the straightness, smooth surface, accurate size and excellent machinability of Republic Cold Finished Steel.

It will pay you to consider Republic Cold Finished Steel in terms of your production and application problems. Simply contact your local Republic Office or mail coupon for further information, today.



UNIFORMLY STRONG IRON POWDER PARTS are easier to achieve when you specify Republic Iron Powder. Its high green and sintered strength simplifies your processing and handling. Particle size and apparent density are carefully controlled. Uniform consistency is assured. Republic can help you determine suitability of your parts to iron powder production—or recommend other methods and materials.

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☐ Alloy Steels ☐ Iron Powder

Name_____ Title_____

Company_____

Address_____

City_____ Zone____ State_____

lengths. *Write*: Fielden Instrument Division, Robertshaw-Fulton Controls Co., 2920 N. Fourth St., Philadelphia 33, Pa. *Phone*: Garfield 6-6750

Open Back Press

The 3F Rousselle, 25-ton press has 15 in. of throat clearance.

The semisteel frame is heavily reinforced to provide necessary rigidity. A heavy clutch can be set

for single stroke or continuous operation. Bearings are closely mounted to practically eliminate shaft deflection. The machine makes 120 standard 2-in. strokes a minute. *Write*: Service Machine Co., 2310 W. 78th St., Chicago 20, Ill. *Phone*: Prospect 8-1200

Diesel Engine

The NRTO-6 Turbodiesel develops 335 hp through the use of an exhaust gas turbocharger. This rating is achieved at 2100 rpm, with a 90°F intake temperature from 0 to 4000 ft. For each 1000 ft of altitude over 4000 ft, the engine is derated 1½-per cent.

The six cylinder, four cycle unit has a bore and stroke of 5⅛ x 6 in. and a piston displacement of 743 cu in. The compression ratio is 14.5:1.

The turbocharger blows fresh

air into the intake manifold and cylinders under pressure. Each cylinder has dual exhaust and intake valves to insure fast removal of exhaust gases and a full charge of fresh air. *Write*: Cummins Engine Co. Inc. Columbus, Ind. *Phone*: 4461

Titanium Wire

Vacuum melting produces clean, ductile titanium wire (alloyed or unalloyed) for welding and other uses.

Selected, blended sponge is pressed into rounds and fed into a water-cooled copper crucible where an arc is struck. Melting takes place in a vacuum.

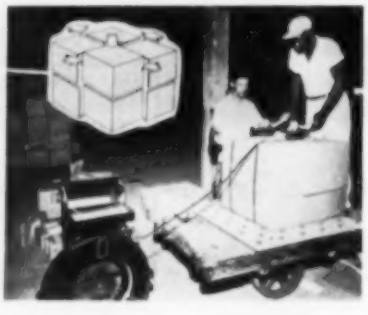
All ingots are melted twice. Wire is drawn from the ingots into 0.030 to 0.25-in. gages. *Write*: Johnson & Funk Titanium Corp., Wooster, O.

Adjustable Container

Adjusta-Pak comes in three sizes which do the work of 800 master package sizes.

To make a container, eight pieces of scored and slotted corrugated board are telescoped together to form one outer container and then secured with steel strapping.

The need for cartons of precise

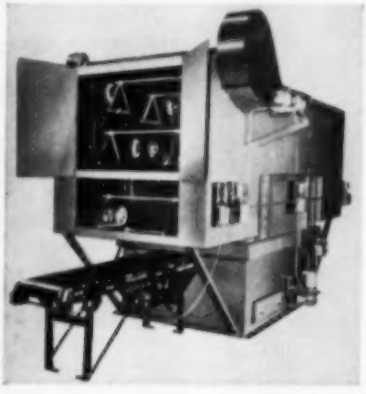


size or the cutting down of expensive custom cartons is eliminated.

Adjusta-Pak gives full protection to export packages. *Write*: Signode Steel Strapping Co., 2600 N. Western Ave., Chicago 47, Ill. *Phone*: Armitage 6-8500

Degreaser

The conveyor speed of this degreaser is about 8 fpm. A motorized belt at the loading end of the machine provides automatic feeding; another conveyor takes the work off as it emerges from the degreaser.



Special hangers pick up work baskets from the loading conveyor and feed them through the machine automatically.

The unit comes in electric, steam and gas heated models. Capacity is about 3000 lb of work an hour. *Write*: Phillips Mfg. Co., 3443 W. Touhy Ave., Chicago 45, Ill. *Phone*: Ambassador 2-6020

Milling Machine

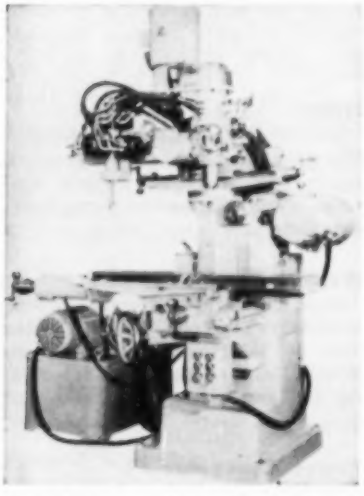
Model 10RH will mill, jig bore and duplicate in three dimensions. It has a hydraulic duplicator attachment for making duplicate molds and dies or for contour milling to templates.

The duplicator sensing tracer head controls the movement of the table, knee and ram slide. As the operator moves the stylus over the master, the cutter duplicates his movements. Only 4 ounces of stylus pressure are needed for accurate reproduction of metal, plastic and wood masters.

The machine has a reversible ram turret with an all-angle spindle head at one end and a slotting head

at the other. Only a few seconds are needed to change from milling to slotting.

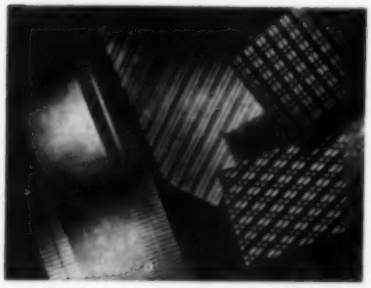
Speeds of the vertical spindle range from 75 to 6400 rpm. Horizontal spindle speeds range from



55 to 3600 rpm. The table is 42 x 9 in. and has a traverse travel of 26 in. *Write*: Axelson Mfg. Co., division of U. S. Industries Inc., P. O. Box 58335, Los Angeles 58, Calif. *Phone*: Ludlow 7-1271

Prefinished Metals

A wide variety of distinctive machined finishes is available in sheets, strips and coils. The metals can be used for the complete product fabrication of small units and for trim and paneling on large appliances, such as ranges and refrigerators.

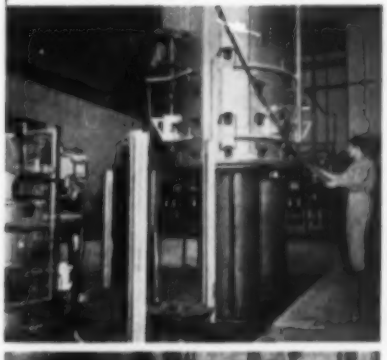


Striped patterns come in all types of arrangements, combinations and widths. Crimps are available. *Write*: Department SLC, Apollo Metal Works, 6650 S. Oak Park Ave., Chicago 38, Ill.

Bright Annealing?
Normalizing?
Nitriding?
Spheroidizing?

You can't beat

CONTINENTAL TOP HAT



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Faster and More Uniform Heating Rate
Extra large volume of recirculating atmosphere.

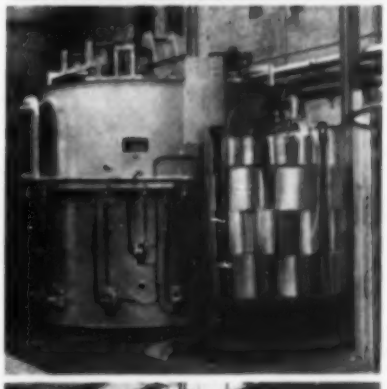
Highest Production per Unit

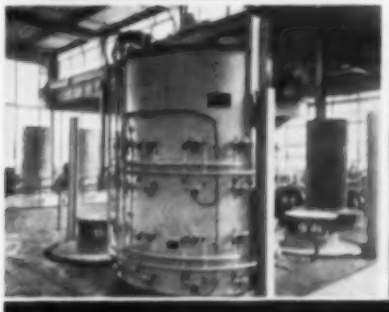
Versatility
Can be used for bright annealing, normalizing, nitriding, or spheroidizing coiled wire or strip—ferrous or nonferrous.

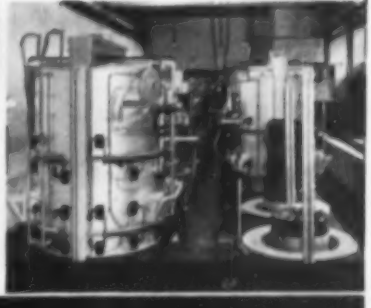
High Efficiency
No radiant tubes.

Long Hood Life
No flame impingement.

Full particulars and recommendation for any job on request.







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NEW literature

Write directly to the company for a copy

Tubular Products

Technical data card 186 is a 4-page guide to specifications and uses of tubular products, fittings and flanges in various grades of steel. Tubular Products Division, Babcock & Wilcox Co., Beaver Falls, Pa.

Filters

Bulletin 052, 12 pages, describes filters for raw water, light processing liquids and centralized coolant systems. Cuno Engineering Corp., Meriden, Conn.

Welding Products

Rods, plates, special shapes, wedge bars, tooth repointers and applicator bars of manganese-nickel-steel are covered in a 4-page bulletin, 3-56-1M. Taylor-Wharton Division, Harsco Corp., High Bridge, N. J.

Power Conveyors

Portable, stationary, horizontal and inclined power conveyors are described in bulletin 302, 24 pages. Harry J. Ferguson Co., 149 West Ave., Jenkintown, Pa.

Electric Heating Cable

A cable insulated with silicone rubber that can be operated continuously at 275°F is described in a 4-page bulletin. Edwin L. Wiegand Co., 7500 Thomas Blvd., Pittsburgh 8, Pa.

Electrodes

Bulletin SB-1351, is a directory for mild steel and low alloy, high tensile steels. Lincoln Electric Co., Cleveland 17, O.

Thermocouples

Pressure sealing glands and thermocouple assemblies are depicted in a 28-page bulletin, 1556. Conax Corp., 7811 Sheridan Dr., Buffalo 21, N. Y.

Casting Chart

Designations of heat resistant stainless steel castings are correlated by bulletin 156-H. Empire Steel Castings Inc., Reading, Pa.

Generating Plants

Bulletin A-428, 8 pages, describes a complete line of electric generating plants. D. W. Onan & Sons Inc., Minneapolis 14, Minn.

Gas Analysis

Data sheet 10.15-8a, 4 pages, describes Davis thermal conductivity type gas analyzers. Davis combustible

NEW LITERATURE

gas analyzers are covered in data sheet 10.15-4b, 4 pages. Industrial Division, Minneapolis-Honeywell Regulator Co., Wayne & Windrim Ave., Philadelphia 44, Pa.

Welding

Recommended practices for welding steel castings, useful to the fabricator as well as the foundryman, are given in a 40-page booklet. Tempil® Corp., 132 W. 22nd St., New York 11, N. Y.

Precision Casting

An 18-page bulletin describes the use of ethyl silicate in investment casting. R. W. Greeff & Co. Inc., 10 Rockefeller Plaza, New York 20, N. Y.

Water Treatment

Bulletin 75a, 16 pages, describes a packaged unit for removing solids from waste water by settling. Department PR, Chain Belt Co., Milwaukee 1, Wis.

Remote Weighing

An 8-page bulletin, 2975, describes the remote recording of weights in digital form. Toledo Scale Co., Toledo 1, O.

Subminiature Switches

Bulletin 75a, 16 pages, describes, 56 different switches, auxiliary actuators and switch assemblies. Micro Switch Division, Minneapolis-Honeywell Regulator Co., Freeport, Ill.

Beryllium Copper

Casting techniques, properties and advantages of beryllium-copper alloys are presented in a 12-page bulletin. Beryllium Corp., Reading, Pa.

Power Take-Offs

Bulletin 308, 8 pages, presents a line of friction power take-offs for industrial engines. Twin Disc Clutch Co., Racine, Wis.

Steel Improvement

Bulletin 5, 8 pages, describes a process for increasing the heat, wear and corrosion resistance of steel by high temperature diffusion of chromium into the surface. Chromalloy Corp., 450 Tarrytown Rd., White Plains, N. Y.

Subzero Temperatures

A cabinet with a 2-cu-ft capacity for the cold treatment of metals is described in bulletin 61, 2 pages. Department SZ-297, Webber Engineering Corp., Box 217, Indianapolis 6, Ind.

Fire Safety In Action . . .

You're looking at an "Automatic" SPRAY Sprinkler an instant after fire has triggered it into action. The deluge of water will snuff out a blaze before it has a chance to gain headway. Millions of these ingenious devices provide a 24-hour-a-day fire watch in tens of thousands of industrial, commercial and institutional buildings throughout the land.

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Complete descriptive literature now available.
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For data on SPECIAL HAZARD Fire Protection, write for Bulletin 73.

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CORPORATION OF AMERICA
YOUNGSTOWN, OHIO

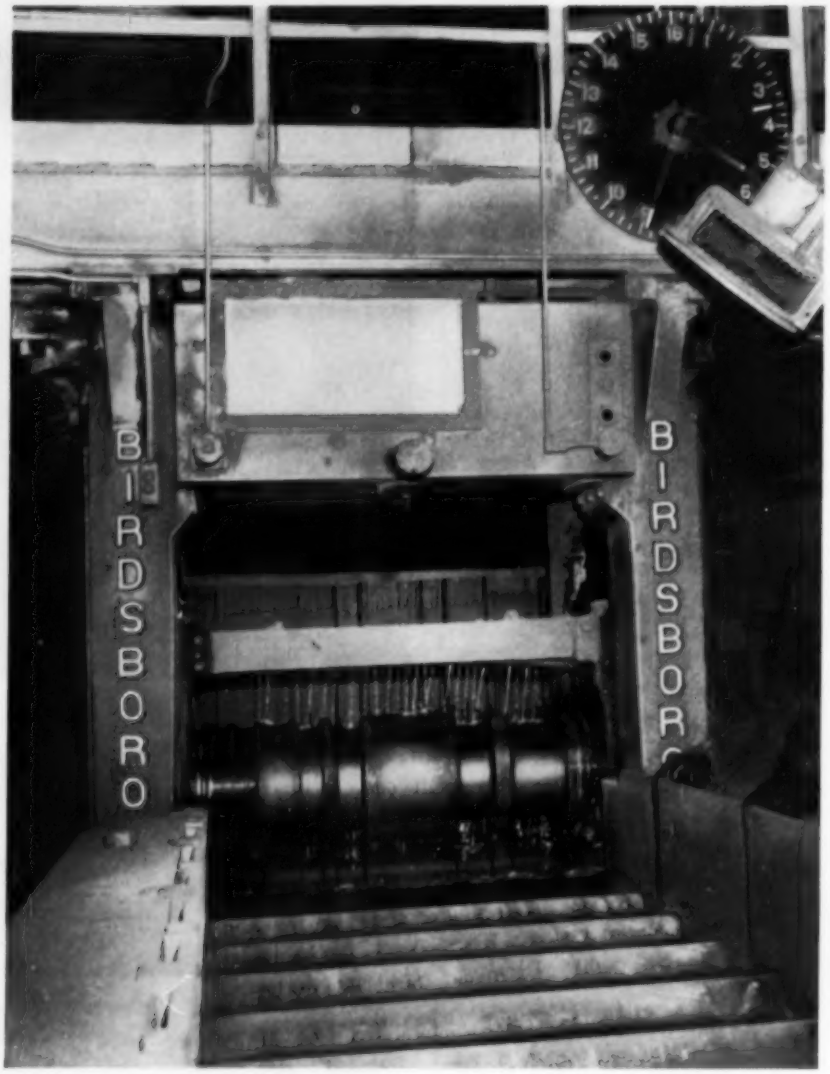
Offices In Principal Cities of North and South America

Steel industry will add 60 million tons capacity at a cost of $17½ billions

With Expansion Plans On Paper, Steelmen Seek Ways to Cut Production Costs

By 1970, authoritative forecasts indicate that the steel industry will add another 60 million tons capacity to satisfy demand. Many producers are already "expansioneering" to new tonnage highs. Others have plans in the works. But the immediate question for steelmen is: how to produce *extra* tonnage while holding costs in line.

That's exactly why more and more plants are writing BIRDSBORO Rolls into specifications for new and larger mills. Why not let a roll specialist from BIRDSBORO explain the advantages you can get through individualized roll service.



DESIGNERS AND BUILDERS OF:

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- HYDRAULIC PRESSES (Metalworking and Extrusion)
- CRUSHING MACHINERY
- SPECIAL MACHINERY
- STEEL CASTINGS
- Weldments "CAST-WELD" Design
- ROLLS: Steel, Alloy Iron, Alloy Steel

IRON BASE ROLLS: Grainloy, Birdsboro Metal, Curoloy, Superloy, Super Curoloy

STEEL BASE ROLLS: Diamondite, Birdsboro Special, Birdsboro "30", "40", "50", and "75"

BIRDSBORO

BIRDSBORO STEEL FOUNDRY & MACHINE CO., Main Offices in Birdsboro, Pa. District Office: Pittsburgh, Pa.

New York Office: **Engineering Supervision Co.,** *120 West 42nd Street, New York 36, N.Y.*

Market Outlook

TOTAL steel inventories have increased each month since last July, but there won't be a general inventory recession such as there was in the last half of 1953.

Steel inventories are not heavy in all consuming industries, and a strong rate of consumption in the last half is in prospect.

UNEVEN— It's estimated there are 18 million to 20 million tons of finished steel in inventory—a three-month supply if it were evenly distributed as to products and consumers. But the distribution is not even. The automobile industry is believed to have the largest steel inventories of any consuming group, and a large portion of it is cold-rolled carbon sheets. In contrast, supplies of plates (particularly the thicker sizes) and structural shapes (particularly wide flange beams) are in woefully short supply. Some other products, like high alloy steel tubing, also can't fill demand.

EXAMPLE— An indication that consumers' steel inventories are not top heavy came quickly in the Birmingham area when a major steel producer was closed down by a railroad strike. Some of this producer's customers soon ran out of steel.

Although steel inventories have been growing for the last year, the rate of growth turned downward in April and May, and particularly in June.

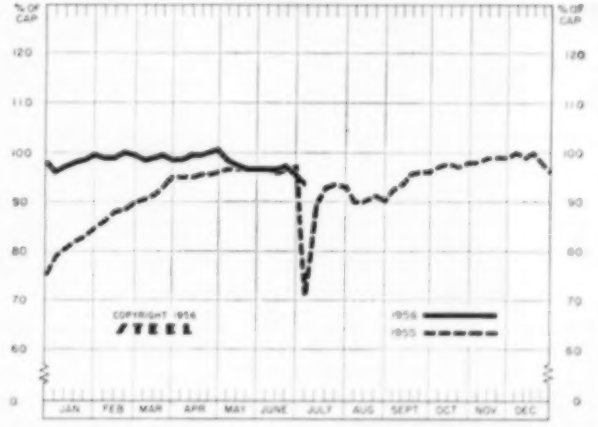
SUPPORTS— Main assurance that there won't be a general recession in steel inventories in the last half of 1956 is the outlook for demand. The current annual rate of the gross national product is 7.5 per cent over that of mid-1953. The metalworking industry's current annual rate of sales is 14 per cent above that of mid-1953. Personal income is running 12 per cent above the level of mid-1953. Businessmen's plans for plant and equipment expenditures this year exceed those in 1953 by 29 per cent. (This means a lot of steel will be used by the construction and machinery industries—the second and fourth largest consumers of steel.) The auto industry—largest user of steel—is due for a rebound late this year when the 1957 models come out. A market research man in one of the large steel companies expects the auto industry to buy 85 per cent as much steel in the fourth quarter of this year as it did in 1955's fourth quarter—a period of heavy buying.

High income, a high rate of business in general and good business prospects for consumers of large amounts of steel are insurance against a broad reduction in steel buying.

PRODUCTION PROSPECTS— Although a good rate of steel buying is the prospect for the last half of this year, steel ingot production is not likely to come up to that of the first half. The third quarter, embracing the vacation period and summer doldrums, detracts from production prospects for the second half.

A RECORD— Even though June output (a little over 9.5 million net tons of ingots) was the lowest of any month in the first half, it was good enough to help make the first six months a record half. Ingot production in that half was approximately 62,450,000 net tons—an annual rate of 124.9 million tons. The record annual output was 1955's 117 million tons.

NATIONAL STEELWORKS OPERATIONS



DISTRICT INGOT RATES

(Percentage of capacity engaged)

	Week Ended July 14	Change	Same Week 1955	Same Week 1954
Pittsburgh	97.5	+ 2.5*	74.5	67
Chicago	95	— 3*	72.5	79
Mid-Atlantic	96	— 1	74	57
Youngstown	100	— 1	80	72
Wheeling	93	— 6.5	88	88.5
Cleveland	100	+ 5*	73.5	58.5
Buffalo	105	0	80	67
Birmingham	23.5	0	96	76
New England	86	+ 1	85	50
Cincinnati	90	+ 1.5	81	64
St. Louis	94.5	— 2	108	65.5
Detroit	93	— 1.5	80	24
Western	105	0	105	86
National Rate	93.5	— 2	71	67

INGOT PRODUCTION‡

	Week Ended July 7	Week Ago	Month Ago	Year Ago
INDEX (1947-1949=100)	144.1†	142.6	147.5	106.8
NET TONS (In thousands)	2,314†	2,290	2,370	1,716

*Change from preceding week's revised rate.
†Estimated. ‡Amer. Iron & Steel Institute
Weekly capacity (net tons): 2,461,893 in 1956; 2,413,278 in 1955; 2,384,549 in 1954
‡Subject to revision

Metalworking Outlook—p. 27

Technical Outlook—p. 65

Price Indexes and Composites

FINISHED STEEL PRICE INDEX (Bureau of Labor Statistics)

	June 26 1956	June 19 1956	Month Ago	May Average
(1947-1949=100)	158.2	158.2	158.2	158.1

AVERAGE PRICES OF STEEL (Bureau of Labor Statistics)

Week Ended June 26

Prices include mill base prices and typical extras and deductions. Units are 100 lb except where otherwise noted in parentheses. For complete description of the following products and extras and deductions applicable to them, write to STEEL.

Rails, Standard, No. 1	$4.800	Sheets, Electrical	$10.175
Rails, Light, 40 lb	6.217	Strip, C.R., Carbon	8.243
Tie Plates	5.625	Strip, C.R., Stainless, 405 (lb)	0.444
Axles, Railway	8.350	Strip, H.R., Carbon	5.606
Wheels, Freight Car, 33 in. (per wheel)	52.50	Pipe, Black, Buttweld (100 ft)	16.997
Plates, Carbon	5.200	Pipe, Galv., Buttweld (100 ft)	21.137
Structural Shapes	4.867	Pipe, Line (100 ft)	170.088
Bars, Tool Steel, Carbon (lb)	0.460	Casing, Oil Well, Carbon (100 ft)	165.120
Bars, Tool Steel Alloy, Oil Hardening Die (lb)	0.560	Casing, Oil Well, Alloy (100 ft)	264.080
Bars, Tool Steel, H. R., Alloy, High Speed W 6.75, Cr 4.5, V 2.1, Mo 5.5, C 0.80 (lb)	1.185	Tubes, Boiler (100 ft)	41.530
Bars, Tool Steel, H.R., Alloy, High Speed W 18, Cr 4, V 1 (lb)	1.680	Tubing, Mechanical, Carbon (100 ft)	21.360
Bars, H.R., Alloy	9.475	Tubing, Mechanical Stainless, 304 (100 ft)	178.897
Bars, H.R., Stainless, 303 (lb)	0.450	Tin plate, Hot-dipped, 1.25 lb	9.333
Bars, H.R., Carbon	5.500	Tin Plate, Electrolytic, 0.25 lb.	8.033
Bars, Reinforcing	5.313	Black Plate, Canmaking Quality	7.133
Bars, C.F., Carbon	9.000	Wire, Drawn, Carbon	8.575
Bars, C.F., Alloy	12.375	Wire, Drawn, Stainless, 430 (lb)	0.590
Bars, C.F., Stainless, 303 (lb)	0.475	Bale ties (bundle)	6.537
Sheets, H.R., Carbon	5.345	Nails, Wire, 8d Common	8.505
Sheets, C.R., Carbon	6.214	Wire, Barbed (80-rod spool)	7.847
Sheets, Galvanized	7.770	Woven Wire Fence (20-rod roll)	18.635
Sheets, C.R., Stainless, 302 (lb)	0.500		

STEEL's FINISHED STEEL PRICE INDEX*

	June 27 1956	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Index (1935-39 av.=100)	210.45	210.45	210.45	194.53	171.92
Index in cents per lb	5.701	5.701	5.701	5.270	4.657

STEEL's ARITHMETICAL PRICE COMPOSITES

Finished Steel, NT*	$128.98	$128.98	$128.98	$118.45	$106.32
No. 2 Fdry Pig Iron, GT	60.27	60.27	60.27	56.54	52.54
Basic Pig Iron, GT	59.80	59.80	59.80	56.04	52.16
Malleable Pig Iron, GT	61.27	61.27	61.27	57.27	53.27
Steelmaking Scrap, GT	46.00	46.00	47.17	38.50	44.00

*For explanation of weighted index see STEEL, Sept. 19, 1949, p. 54; of arithmetical price composite, STEEL, Sept. 1, 1952, p. 130.

Comparison of Prices

Comparative prices by districts, in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED STEEL	June 27 1956	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Bars, H.R., Pittsburgh	4.65	4.65	4.65	4.30	3.70
Bars, H.R., Chicago	4.65	4.65	4.65	4.30	3.70
Bars, H.R., deld. Philadelphia	4.93	4.93	4.93	4.55	4.20
Bars, C.F., Pittsburgh	6.25*	6.25*	6.25*	5.40	4.55
Shapes, Std., Pittsburgh	4.60	4.60	4.60	4.25	3.65
Shapes, Std., Chicago	4.60	4.60	4.60	4.25	3.65
Shapes, deld., Philadelphia	5.00	5.00	5.00	4.53	3.91
Plates, Pittsburgh	4.50	4.50	4.50	4.225	3.70
Plates, Chicago	4.50	4.50	4.50	4.225	3.70
Plates, Coatesville, Pa.	4.50	4.50	4.50	4.225	4.15
Plates, Sparrows Point, Md.	4.50	4.50	4.50	4.225	3.70
Plates, Claymont, Del.	5.35	5.35	5.35	4.225	4.15
Sheets, H.R., Pittsburgh	4.325	4.325	4.325	4.05	3.60-3.75
Sheets, H.R., Chicago	4.325	4.325	4.325	4.05	3.60
Sheets, C.R., Pittsburgh	5.325	5.325	5.325	4.95	4.35
Sheets, C.R., Chicago	5.325	5.325	5.325	4.95	4.35
Sheets, C.R., Detroit	5.325-5.425	5.325-5.425	5.325-5.425	5.10	4.55
Sheets, Galv., Pittsburgh	5.85	5.85	5.85	5.45	4.80
Strip, H.R., Pittsburgh	4.325	4.325	4.325	4.05	3.75-4.00
Strip, H.R., Chicago	4.325	4.325	4.325	4.05	3.50
Strip, C.R., Pittsburgh	6.25	6.25	6.25	5.75	4.65-5.35
Strip, C.R., Chicago	6.25-6.35	6.25-6.35	6.25-6.35	5.85	4.90
Strip, C.R., Detroit	6.35	6.35	6.35	5.90	4.35-5.60
Wire, Basic, Pittsburgh	6.60	6.60	6.60	5.75	4.85-5.10
Nails, Wire, Pittsburgh	7.60	7.60	7.60	6.85	5.90-6.20
Tin plate (1.50 lb), box, Pitts.	$9.85	$9.85	$9.85	$9.05	$8.70

*Including 0.35c for special quality

SEMIFINISHED STEEL					
Billets, forging, Pitts. (NT)	$84.50	$84.50	$84.50	$78.00	$66.00
Wire rods, $\frac{7}{32}$-$\frac{9}{16}$" Pitts.	5.375	5.375	5.375	4.675	4.10-4.30

PIG IRON, Gross Ton					
Bessemer, Pitts.	$61.00	$61.00	$61.00	$57.00	$53.00
Basic, Valley	60.00	60.00	60.00	56.00	52.00
Basic, deld. Phila.	63.76	63.76	63.76	59.66	56.49
No. 2 Fdry, Pitts.	60.50	60.50	60.50	56.50	52.50
No. 2 Fdry, Chicago	60.50	60.50	60.50	56.50	52.50
No. 2 Fdry, deld. Phila.	64.26	64.26	64.26	55.16	56.99
No. 2 Fdry, Birm.	55.00	55.00	55.00	52.88	48.88
No. 2 Fdry (Birm.) deld. Cin	62.70	62.70	62.70	60.58	55.33
Malleable, Valley	60.50	60.50	60.50	56.50	52.50
Malleable, Chicago	60.50	60.50	60.50	56.50	52.50
Ferromanganese, Duquesne	215.00†	215.00†	215.00†	190.00†	168.00*

†74-76% Mn, net ton. *75-82% Mn, gross ton, Etna, Pa.

SCRAP, Gross Ton (Including broker's commission)					
No. 1 Heavy Melt, Pittsburgh	$44.50	$44.50	$45.50	$35.50	$45.50
No. 1 Heavy Melt, E. Pa.	47.50	47.50	48.00	39.00	43.50
No. 1 Heavy Melt, Chicago	46.00	46.00	48.00	35.00	43.50
No. 1 Heavy melt, Valley	44.50	47.50	49.50	37.50	45.00
No. 1 Heavy Melt, Cleve.	42.50	45.50	47.50	35.00	44.00
No. 1 Heavy Melt, Buffalo	42.50	45.50	48.50	29.50	44.00
Rails, Rerolling, Chicago	66.50	67.50	71.50	52.50	52.50
No. 1 cast, Chicago	45.50	45.50	45.50	42.50	49.00

COKE, Net Ton					
Beehive, Furn. Connlsvl.	$14.125	$14.125	$14.125	$13.75	$14.75
Beehive, Fdry, Connlsvl.	16.50	16.50	16.50	16.75	17.50
Oven, Fdry, Chicago	27.00	27.00	27.00	24.50	21.00

Daily Nonferrous Price Record

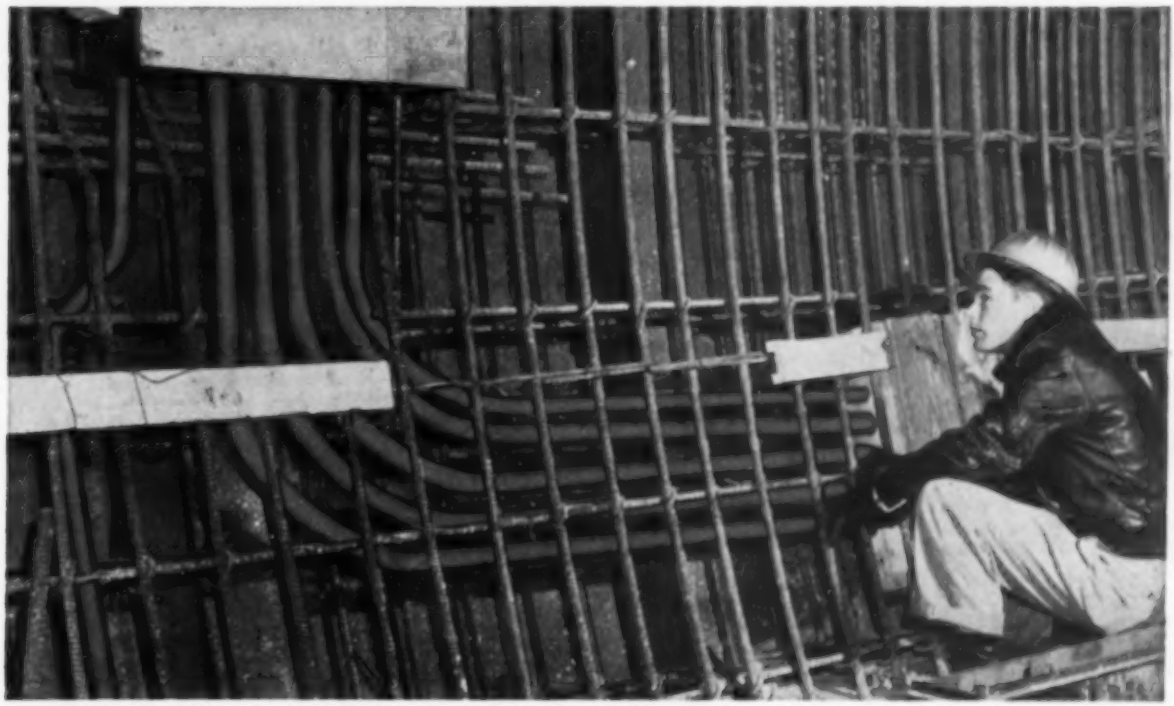
	June 27 Price	Last Change		Previous Price	May Avg.	Apr. Avg.	June 1955 Avg.
Copper	40.00-46.00	May	29, 1956	43.00-46.00	45.096	47.500	36.000
Lead	15.80	Jan.	13, 1956	16.30	15.800	15.800	14.800
Zinc	13.50	Jan.	6, 1956	13.00	13.500	13.500	12.250
Tin	95.00	June	27, 1956	94.625	97.024	99.270	93.668
Nickel	64.50	Nov.	24, 1954	60.00	64.500	64.500	64.500
Aluminum	25.90	Mar.	29, 1956	24.40-25.90	25.900	25.900	23.200
Magnesium	33.75	Apr.	16, 1956	32.50	33.750	33.150	28.500

Quotations in cents per pound based on: COPPER, deld. Conn. Valley; LEAD, common grade, deld. St. Louis; ZINC, prime western, E. St. Louis; TIN, Straits, deld. New York; NICKEL, electrolytic cathodes, 99.9%, base size at refinery, unpacked; ALUMINUM, primary ingots, 99 + %, deld.; MAGNESIUM, pig, 99.8%, Velasco, Tex.

What You Can Use the Markets Section for:

- **A source of price information.**
  Current prices are reported each week. Price changes are shown in italics. Price trends are shown in tables of indexes and comparisons.
- **A directory of producing points.**
  Want to know who makes something, or where it is made? The steel price tables alphabetically list the cities of production and indicate the producing company. If you are a buyer, you may want to make a map showing comparative distances of sources of supply and to help you compute freight costs. If you are a seller of supplies you can make a map to spot your sales possibilities.
- **A source of price data for making your own comparisons.**
  Maybe you want to keep a continuous record of price spread between various forms of steel. You can get your base price information from STEEL's price tables.
- **A source of information on market trends.**
  Newsy items tell you about the supply-demand situation of materials, including iron and steel, nonferrous metals and scrap. Other articles analyze special situations of interest and importance to you.
- **Reports on iron and steel production, and materials and product shipments.**

Power for the new 7,650-foot Baltimore Harbor Tunnel will be protected by EVERDUR Electrical Conduit



Everdur Electrical Conduit, nominal size 1½", connecting control box to sidewalk manhole—all conduit to be embedded in concrete.

A section of Everdur Conduit in the roadbed slab protects the vital traffic control system and air duct lighting.

THE BALTIMORE HARBOR TUNNEL†, under the Patapsco River, scheduled for completion in 1957, will be the largest "trench-type" tunnel ever built. Twin-tube sections are built on dry land, launched and concreted almost to zero buoyancy, then sunk in place and joined underwater by divers.

Power for traffic signals, alarms, air duct lighting, and shaft lighting circuits for this great tunnel will be protected by Everdur® Electrical Conduit—made from one of Anaconda's copper-silicon alloys. Everdur never rusts—offers high resistance to other types of corrosion. It provides dependable year-after-year protection—wherever water and corrosive atmospheres are a problem—or where conduit must be buried or embedded in concrete. Everdur is also tough—stands up under movement and vibration.

For detailed information, write: The American Brass Company, Buffalo Division, Buffalo 5, New York. In Canada: Anaconda American Brass Limited, New Toronto, Ontario.

®Reg. U.S. Pat. Off.

†Built by Maryland State Roads Commission, Merritt-Chapman & Scott Corp., General Contractors; Siegstad & Baillie, Contracting Engineer; J. E. Greiner Co., Consulting Engineer.

EVERDUR ELECTRICAL CONDUIT

ANACONDA®

COPPER-SILICON ALLOYS

CORROSION-RESISTANT • STRONG • NONMAGNETIC • WORKABLE • WELDABLE

Nonferrous Metals

Labor tranquility helps build confidence as producers anticipate more stabilized prices during the second half. Increased costs will force some price hikes

Nonferrous Metal Prices, Pages 102 & 103

LOOK FOR MOST nonferrous metals to hold the status quo on prices in the second half. Exceptions: Copper prices will drop sharply; aluminum prices will rise 2 to 3 cents a pound.

Copper—Tranquil labor settlements (three-year contracts were signed) in the U. S. and the end of a three-day strike at six northern Rhodesian copper mines brought quotations on the London Metal Exchange to 36.20 cents a pound on June 26. Custom smelters continue to hold the line at 40 cents; primary producers, 46 cents.

Mills are attempting to exert pressure on primary copper companies for quick price reductions by delaying first of the month deliveries to the end of the month. It means that primary producers are carrying large inventories for longer periods.

Outlook: If the prospects for uninterrupted flow remain bright, primary producers will lower red metal prices during the first part of July. They are building up necessary inventories (with the aid of customer buying resistance) which will help them to meet an avalanche of orders when prices plummet to 40 cents a pound or lower.

Aluminum—Depending on the outcome of labor negotiations (some experts predict that the wage package will cost producers 15 cents to 20 cents an hour per worker), aluminum prices will be hiked 2 to 3 cents a pound (the present ingot price is 25.90 cents a pound) during the latter part of the third quarter. The price hike will recover the outlay for added wages and bring some much needed expansion capital into company treasuries.

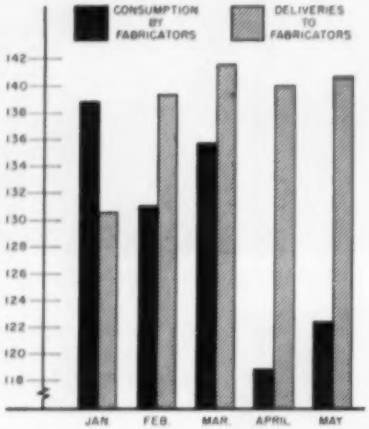
Lead, Zinc—The General Services Administration's interest in purchases of lead and zinc for stockpile will continue into the second half and will allow these metals to hold at current price levels (lead, 16 cents a pound; zinc 13.50 cents). The U. S. barter program—agricultural commodities to foreign countries in exchange for lead and zinc for the U. S. supplemental stockpile—will help to stabilize world markets.

Tin—Because the government's Texas City smelter is still operating and will continue to be a factor in the market (as a purchaser of tin concentrates) until late in the fourth quarter, look for tin prices to stay at about the 94-95 cents a pound level during most of the second half. Last week, President Eisenhower signed a bill authorizing the sale of the smelter on Jan. 31, 1957.

The Tin Council, governing body of the International Tin Agreement, is getting into its organizational meetings. It is felt the Council will be ready to purchase any excess tin which might appear on the market during the fourth quarter. (It is authorized to make purchases at about the 90 cent a pound level.)

Fabricators Build Copper Stocks

(Thousands of net tons, 1956)



Nickel—Demand will continue to outstrip supply. Nickel will sell through legitimate sources at 64.50 cents a pound during the third quarter. It is possible that operating increases could force the price up a cent or two a pound during the fourth quarter. Any price hike is tied in closely with the price of copper. International Nickel Co. has been able to come up with record earnings based on its sale of copper ores, as well as nickel. If copper prices should take a serious plunge, it might force Inco to reappraise how much it is costing to produce nickel. Up to this time—and it should continue—Inco has resisted the wails of smaller producers for price hikes.

One nickel salesman told STEEL: "People are not as frantic for nickel as they have been." While there is still a definite shortage, it may be that automotive cutbacks are making a larger piece of the supply pie available to wider segments of industry. Vacations and the uncertainty of steel operations are contributing to the "less cause for concern" attitude of some users.

Magnesium—Look for important announcements from magnesium advocates in the next few weeks. There is a growing feeling that current industry capacity (75,000 tons annually) is insufficient to meet growing civilian and military demands. Rumors are flying that there will be a second producer in the near future. Reasons: 1. The government is showing new interest in magnesium for stockpile. 2. High purity magnesium is needed for the reduction of uranium. 3. Civilian applications are mushrooming.

Magnesium production will continue at or near capacity during the third and fourth quarters. Magnesium salesmen say they will strive to keep the price at the present level (ingot, 34.50 cents a pound), so that blossoming civilian interest can ripen into expanded markets.

Titanium—C. I. Bradford, president, Rem-Cru Titanium Inc., predicts: "We expect to nearly double our 1955 shipments in 1956." A good share of this industry optimism centers on the fact that most producers' books are filled through the third quarter and for most of the fourth. With interest at an all-time high, look for announcements of further price reductions in titanium sponge and mill products during the second half (current titanium sponge price is $3.25 a pound).

Market Memos

- E. B. Wilber, vice president, Aluminum Co. of America, comments: "If you consider the present markets for aluminum, take into account certain markets not yet acquired and add the effect of a steadily growing population . . . no limitation can be placed on the future use of aluminum. How can you place a limit on human ingenuity?"
- The New Jersey Zinc Co. settled its 52 day strike on June 22. Zinc production lost: Some 20,000 tons. U. S. Steelworkers of America settled for wage hikes of 10 cents an hour, plus fringe benefit adjustments.

BRIDGEPORT BRASS COMPANY

COPPER ALLOY BULLETIN

Bridgeport BRASS CO.

Reporting new developments in copper-base alloys and metalworking methods.

Bridgeport Alloys Used for Heart of Transmitting Tubes

Today's rapid developments in radar and communications give increasing importance to the electron tube for generating and amplifying ultra-high and microwave frequencies for radar and communication systems.

In manufacturing electron tubes, Eitel-McCullough, Inc. of San Bruno, California—a leading producer of transmitting tubes—faced several difficult problems. The primary problem was that vacuum tube production requires firing at extremely high temperatures in a hydrogen atmosphere. Under these conditions, ordinary copper becomes spongy and porous. Specifying Bridgeport Oxygen-Free copper provides the solution.

Other major requirements for metals also exist. While the majority of electron tube components are formed, many are machined to exact dimensions from rod and tube. Eitel-McCullough requires a metal that can be easily fabricated in deep-drawing, is a good electrical conductor and is adaptable to plating. Here, too, Bridgeport alloys proved to be the solution.

Bridgeport alloys are used because they can meet Eitel-McCullough's exacting requirements in manufacturing and finished product performance, as well as providing consistently uniform composition. Bridgeport O.F.H.C. copper is used for many tube parts—anodes, support structures, coolers, cooler cores, drift tube sections, index sleeves and static sleeves.

Transmitting tubes are one of many products using Bridgeport Alloys for special applications. Your product, too, can use Bridgeport "job matched" alloy. Call your nearest Bridgeport sales office today.

The Importance of "Machineability"

Low-cost, large-volume production depends on the "machineability" of the metal used to do the job. In establishing the machineability ratings of alloys, Bridgeport Metallurgists consider these five factors the most important: speed of machining... tool life... finish... accuracy... and power required.

While copper and each of its alloys have individual characteristics, Bridgeport copper-base alloys have been grouped into three broad machineability classifications:

Free-Cutting Alloys

Machineability rating 100% to 70%. All alloys in this group are leaded, and produce short, brittle chips. For example, most jobs that call for free-cutting brass rod can be entrusted to Bridgeport Ledrite #6 Standard, machineability rating of 100%. Ledrite #6 is easy to cut, gives longer tool life... products are smooth, clean-surfaced.

Moderately Machineable Alloys

Machineability rating 70% to 30%. This group covers some leaded refractory alloys and some non-leaded brasses. Bridgeport Duronze III, a silicon aluminum bronze, is also included in this classification.

Difficult to Machine

This group includes non-leaded copper, phosphor bronze, silicon bronze, nickel silver and commercial bronze. All produce long, tough, stringy chips.

Finding the right metal or alloy, with the right machineability rating is no chore—if you call Bridgeport. Close cooperation with our Technical Service Division has worked wonders for many fabricators—increasing quality and uniformity, reducing waste, cost of labor and materials. Write or call your nearest Bridgeport Sales Office for high-quality alloys, and for free expert advice in your metal selections. (1155)

Bridgeport BRASS COMPANY ♦ BRIDGEPORT, CONNECTICUT

Mills at Bridgeport, Conn., Indianapolis, Ind., and Adrian, Mich. Sales Offices in Principal Cities—Conveniently Located Warehouses

Nonferrous Metals

Cents per pound, carlots, except as otherwise noted

PRIMARY METALS AND ALLOYS

Aluminum: 99 + %, ingots, 25.90; pigs, 24.00, 10,000 lb or more, f.o.b. shipping point. Freight allowed on 500 lb or more.

Aluminum Alloy: No. 13, 12% Si, 27.70; No. 43, 5% Si, 27.50; No. 132, 4% Cu, 1.5% Mg, 2% Ni, 29.70; No. 195, 4.5% Cu, 0.8% Si, 29.30; No. 214, 3.8% Mg, 29.30; No. 356, 7% Si, 0.3% Mg, 27.70.

Antimony: R.M.M. brand, 99.5%, 33.00; Lone Star brand, 33.50, f.o.b. Laredo, Tex., in bulk. Foreign brands, 99.5%, 27.00-28.00, New York, duty paid, 10,000 lb or more.

Beryllium: 97%, lump or beads, $71.50 per lb, f.o.b. Cleveland or Reading, Pa.

Beryllium Aluminum: 5% Be, $74.75 per lb of contained Be, f.o.b. Reading, Pa., Elmore, O.

Beryllium Copper: 3.75-4.25% Be, $43 per lb of contained Be, with balance as Cu at market price on shipment date, f.o.b. Reading, Pa., or Elmore, O.

Bismuth: $2.25 per lb ton lots.

Cadmium: Sticks and bars, $1.70 per lb deld.

Cobalt: 97-99%, $2.60 per lb for 550-lb keg; $2.62 per lb for 100-lb case; $2.67 per lb under 100 lb.

Columbium, Powder, $119.20 per lb nom.

Copper: Electrolytic, 46.00 deld. Conn. valley; 46.00 deld. Midwest; custom smelters, 45.00 deld.; lake, 46.00 deld.; fire refined, 45.75 deld.

Germanium: First reduction, $201.85-$220 per lb; intrinsic grade, $220-$242.67 per lb, depending on quantity.

Gold: U. S. Treasury, $35 per oz.

Indulum: 99.9%, $2.25 per troy oz.

Iridium: $100-$110 nom. per troy oz.

Lead: Common, 15.80; chemical, 15.90; corroding, 15.90, St. Louis. New York basis, add 0.20.

Lithium: 99 +, cups or ingots, $11.50; rod $13.50; shot or wire, $16.50, f.o.b. Minneapolis, 100 lb lots.

Magnesium: Pig, 33.75 f.o.b. Velasco, Tex.; ingot, 34.50 f.o.b. Velasco, Tex.

Magnesium Alloys: AZ91B (diecasting), 35.00 deld.; AZ63A, AZ92A, AZ91C (sand casting), 39.25 f.o.b. Velasco, Tex.

Mercury: Open market, spot, New York, $260-$262 per 76-lb flask.

Molybdenum: Powder, 99% hydrogen reduced, $3.20 per lb; pressed ingot, $4.06 per lb; sintered ingot, $5.53 per lb.

Nickel: Electrolytic cathodes, sheets (4 x 4 in. and larger), unpacked, 64.50; 10-lb pigs, unpacked, 67.65; "XX" nickel shot, 69.00; "F" nickel shot or ingots for addition to cast iron, 64.50; prices f.o.b. Port Colborne, Ont., including import duty. New York basis, add 0.92.

Osmium: $80-$100 per troy oz, nom.

Palladium: $23-$24 per troy oz.

Platinum: $103-$110 per troy oz from refineries.

Radium: $16-$21.50 per mg radium content, depending on quantity.

Rhodium: $118-$125 per troy oz.

Ruthenium: $45-$55 per troy oz.

Selenium: 99.5%, $13.50-$15.50 per lb.

Silver: Open market, 90.25 per troy oz.

Sodium: 16.50, c.l.; 17.00, l.c.l.

Tantalum: Sheet, rod, $68.70 per lb; powder, $56.63 per lb.

Tellurium: $1.50-$1.75 per lb.

Thallium: $12.50 per lb.

Tin: Straits, N. Y., spot and prompt, 95.00.

Titanium: Sponge, 99.3+%, grade A-1 ductile (0.3% Fe max), $3.25; grade A-2 (0.5% Fe max), $2.95 per pound.

Tungsten: Powder, 98.8%, carbon reduced, 1000-lb lots, $4.50 per lb, nom, f.o.b. shipping point; less than 1000 lb add 15.00; 99+% hydrogen reduced, $5.00. Treated ingot, $6.70.

Zinc: Prime Western, 13.50; brass special, 13.75; intermediate, 14.00, East St. Louis, freight allowed over 0.50 per pound. High grade, 14.85; special high grade, 15.25 deld. Diecasting alloy ingot No. 3, 18.00; No. 2, 19.00; No. 5, 18.50, deld.

Zirconium: Ingots, commercial grade, $14.40 per lb; low-hafnium reactor grade, $23.07. Sponge, commercial grade, $7.50-$10.00 per lb, depending on quantity; reactor grade, $14.00-$22.00 per lb, depending on quantity. Powder, electronics grade, $15 per lb; flash grade, $11.50.

(Note: Chromium, manganese and silicon metals are listed in ferroalloy section.)

SECONDARY METALS AND ALLOYS

Aluminum Ingot: Piston alloys, 25.50-27.50; No. 12 foundry alloy (No. 2 grade), 23.75-24.75; 5% silicon alloy, 0.60 Cu max, 25.25-26.00; 13 alloy 0.60 Cu max, 25.25-26.00; 195 alloy, 25.75-26.50; 108 alloy, 24.25-24.50. Steel deoxidizing grades, notch bars, granulated or shot: Grade 1, 24.50; grade 2, 23.75; grade 3, 23.00; grade 4, 22.50.

Brass Ingot: Red brass, No. 115, 35.50; tin bronze, No. 225, 48.00; No. 245, 41.50; high-leaded tin bronze, No. 305, 38.75; No. 1 yellow No. 405, 30.75; manganese bronze, No. 421, 31.25.

Magnesium Alloy Ingot: AZ63A, 36.00; AZ91B, 36.00; AZ91C, 36.00; AZ92A, 36.00.

NONFERROUS PRODUCTS

BERYLLIUM COPPER

(Base prices per lb, plus mill extras, 2000 to 5000 lb, f.o.b. Temple, Pa.; nominal 1.9% Be alloy) Strip, $1.92; rod, bar, wire, $1.89.

COPPER WIRE

Bare, soft, f.o.b. eastern mills, 30,000-lb lots, 51.355; l.c.l., 51.98. Weatherproof, 30,000-lb lots, 48.28; l.c.l., 49.03. Magnet wire deld., 15,000 lb or more, $58.68; l.c.l., 59.43.

LEAD

(Prices to jobbers, f.o.b. Buffalo, Cleveland, Pittsburgh) Sheets, full rolls, 140 sq ft or more, $21.50 per cwt; pipe, full coils, $21.50 per cwt; traps and bends, list prices plus 30%.

TITANIUM

(Prices per lb, 10,000 lb and over, f.o.b. mill) Sheets, $12.60-$13.10; sheared mill plate, $10.00-$12.00; strip, $12.10-$12.60; wire, $9.00-$11.50; forging billets, $7.25-$7.50; hot-rolled and forged bars, $7.55-$7.80.

ZINC

(Prices per lb, c.l., f.o.b. mill) Sheets, 24.00; ribbon zinc in coils, 21.50; plates, 20.00.

ZIRCONIUM

Plate, $22; H.R. strip, $19; C.R. strip, $29; forged or H.R. bars, $17; wire, 0.015 in., 1.00c per linear foot.

NICKEL, MONEL, INCONEL

	"A" Nickel	Monel	Inconel
Sheets, C.R.	102	83	99
Strip, C.R.	102	92	125
Plate, H.R.	97	87	95
Rod, Shapes, H.R.	87	74	93
Seamless Tubes	122	110	153

ALUMINUM

Screw Machine Stock: 30,000 lb base.

Diam. (in.) or across flats	Round 2011-T3	Round 2017-T4	Hexagonal 2011-T3	Hexagonal 2017-T4
Drawn				
0.125	69.4	67.9	...	...
0.156-0.172	59.0	57.4	...	...
0.188	59.0	57.4	...	73.2
0.219-0.234	56.0	54.4	...	...
0.250-0.281	56.0	54.4	...	69.9
0.313	56.0	54.4	...	66.7
Cold-finished				
0.375-0.547	54.9	52.9	65.2	62.8
0.563-0.688	54.9	52.9	62.1	59.0
0.750-1.000	53.6	51.6	56.9	55.7
1.063	53.6	51.6	...	53.8
1.125-1.500	51.6	49.7	55.1	53.8
Rolled				
1.563	50.3	48.4	...	...
1.625-2.000	49.7	47.7	...	52.0
2.125-2.500	48.5	46.5	...	...
2.563-3.375	47.1	45.1	...	...

ALUMINUM

Sheets and Circles: 1100 and 3003 mill finish (30,000 lb base; freight allowed)

Thickness Range Inches	Flat Sheet	Flat Sheet Circles*	Coiled Sheet	Coiled Sheet Circles†
0.249-0.136	39.0	43.8	...	...
0.135-0.096	39.5	44.7	37.5	42.4
0.095-0.077	40.2	45.7	37.6	42.8
0.076-0.061	40.8	46.6	37.8	43.0
0.060-0.048	41.4	47.1	38.2	43.5
0.047-0.038	41.9	48.0	38.7	43.9
0.037-0.030	42.3	48.5	39.1	44.6
0.029-0.024	42.9	49.0	39.4	45.1
0.023-0.019	43.7	50.5	40.3	46.0
0.018-0.017	44.5	...	40.9	46.9
0.016-0.015	45.4	...	41.7	48.1
0.014	46.4	...	42.7	49.4
0.013-0.012	47.6	...	43.4	50.4
0.011	48.6	...	44.6	52.0
0.010-0.0095	49.9	...	45.8	53.7
0.009-0.0085	51.2	...	47.3	55.8
0.008-0.0075	52.8	...	48.5	57.6
0.007	54.3	...	50.0	59.9
0.006	55.9	...	51.4	64.9

*48 in. max diam. †26 in. max diam.

ALUMINUM

Plates and Circles: Thickness 0.250-3 in., 24-60 in. width or diam, 72-240 in. lengths.

Alloy	Plate Base	Circle Base
1100-F, 3003-F	38.0	42.3
5050-F	39.1	43.4
3004-F	40.1	45.3
5052-F	41.4	46.7
6061-T6	42.6	47.5
2024-T4*	45.1	51.4
7075-T6*	52.9	60.0

*24-48 in. widths or diam, 72-180 lengths.

ALUMINUM

Forging Stock: Round, Class 1, 40.60-51.60 in specific lengths 36-144 in. diameters 0.375-8 in. Rectangles and squares, Class 1, 44.50-57.70 in random lengths, 0.375-4 in. thick, width 0.750-10 in.

Pipe: ASA schedule 40, alloy 6063-T6, 20-ft length, plain ends, 90,000-lb base, per 100 ft.

Nom. Pipe Size(in.)		Nom. Pipe Size(in.)	
⅜	$17.45	2	$ 53.85
1	27.35	4	148.60
1¼	37.95	6	266.55
1½	44.30	8	401.10

MAGNESIUM

Sheet and Plate: AZ31A standard grade, .032 in., 100.00; .081 in., 75.00; .188 in., 66.50; .250-2.0 in., 65.60. AZ31A special grade, .032 in., 163.10; .081 in., 103.50; .188 in., 91.10; .250-2.0, 88.90. Tread plate, .188 in., 68.90; .250-2.0 in., 67.80. Tooling plate, .250-3.0 in., 70.20.

Extruded Solid Shapes:

Factor	Com. Grade (FS)	Spec. Grade (AZ31B)
6-8	66.40-69.00	81.40-84.00
12-14	67.50-69.60	82.50-84.60
24-26	72.10-72.70	87.10-87.70
36-38	84.90-85.80	99.90-100.80

NONFERROUS SCRAP

DEALERS BUYING PRICES

(Cents per pound, New York, in ton lots)

Aluminum: 1100 clippings, 16.00-16.50; old sheets, 13.00-13.50; borings and turnings, 7.50-8.00; crankcases, 12.50-13.00; industrial castings, 12.50-13.00.

Copper and Brass: No. 1 heavy copper and wire, 30.50-31.00; No. 2 heavy copper and wire, 28.00-28.50; light copper, 26.00-26.50; No. 1 composition red brass, 23.00-23.50; No. 1 composition turnings, 22.00-22.50; yellow brass

BRASS MILL PRICES

	MILL PRODUCTS a				SCRAP ALLOWANCES f	
	Sheet, Strip, Plate	Rod	Wire	Seamless Tube	Clean Heavy	Rod Ends	Clean Turnings
Copper	67.13b	64.36c	....	67.32	42.000	42.000	41.250
Yellow Brass	55.60	45.65d	56.14	58.51	31.250	31.000	29.000
Low Brass, 80%	60.15	60.09	60.69	62.96	35.375	35.125	34.625
Red Brass, 85%	61.79	61.73	62.33	64.60	37.000	36.750	36.250
Com. Bronze, 90%	63.98	63.92	64.52	66.84	38.500	38.250	37.750
Manganese Bronze	62.68	56.76	67.00	....	28.875	28.625	28.125
Muntz Metal	56.94	52.75	....	....	29.125	28.875	28.375
Naval Brass	58.84	53.15	65.90	62.06	28.875	28.625	28.125
Silicon Bronze	70.48	69.67	70.52	75.59e	40.750	40.500	39.750
Nickel Silver, 10%	70.16	72.49g	72.49	....	35.625	35.375	17.813
Phos. Bronze, A, 5%	84.92	85.42	85.42	86.60	42.125	41.875	40.875

a. Cents per lb, f.o.b. mill; freight allowed on 500 lb or more. b. Hot-rolled. c. Cold-drawn. d. Free cutting. e. 3% silicon. f. Prices in cents per lb for less than 20,000 lb, f.o.b. shipping point. On lots over 20,000 lb at one time, of any or all kinds of scrap, add 1 cent per lb. g. Leaded

turnings, 13.00-13.50; new brass clippings, 22.50-23.00; light brass, 14.50-15.00; heavy yellow brass, 15.50-16.00; new brass rod ends, 20.50-21.00; auto radiators, unsweated, 17.00-17.50; cocks and faucets, 19.50; brass pipe, 18.00-18.50.

Lead: Heavy, 12.50-12.75; battery plates, 6.50-6.75; linotype and stereotype, 13.50-14.00; electrotype, 12.75-13.00; mixed babbitt, 14.50.

Monel: Clippings, 65.00-90.00; old sheets, 65.00-80.00; turnings, 65.00-70.00; rods, 65.00-90.00.

Nickel: Sheets and clips, 100.00-200.00; rolled anodes, 100.00-200.00; turnings, 85.00-185.00; rod ends, 100.00-200.00.

Zinc: Old zinc, 5.00-5.50; new die-cast scrap, 4.00-4.50; old die-cast scrap, 3.00.

REFINER'S BUYING PRICES

(Cents per pound, carlots, delivered refinery)

Aluminum: 1100 clippings, 18.00-18.75; 3003 clippings, 18.00-18.50; 6151 clippings, 18.00-18.50; 5052 clippings, 18.00-18.50; 2014 clippings, 17.00-18.00; 2017 clippings, 17.00-18.00; 2024 clippings, 17.00-18.00; mixed clippings, 17.00; old sheet, 15.50; old cast, 15.50; clean old cable (free of steel), 17.25-18.00; borings and turnings, 15.00-16.25.

Beryllium Copper: Heavy scrap, 0.020-in. and heavier, not less than 1.5% Be, 68.00; light scrap, 63.00; turnings and borings, 48.00.

Copper and Brass: No. 1 heavy copper and wire, 33.50; No. 2 heavy copper and wire, 32.00; light copper, 29.75; refinery brass (60% copper) per dry copper content, 28.00-28.50.

INGOTMAKERS' BUYING PRICES

(Cents per pound, carlots, delivered)

Copper and Brass: No. 1 heavy copper and wire, 33.50; No. 2 heavy copper and wire, 32.00; light copper, 29.75; No. 1 composition borings, 26.50; No. 1 composition solids, 27.00; heavy yellow brass solids, 18.00; yellow brass turnings, 17.00; radiators, 21.00.

PLATING MATERIAL

(F.o.b. shipping point, freight allowed on quantities)

ANODES

Cadmium: Special or patented shapes, $1.70 per lb.

Copper: Flat-rolled, 63.79; oval 62.92, 5000-10,000 lb; electrodeposited, 57.78; 2000-5000 lb lots; cast, 58.04-59.54, 5000-10,000 lb quantities.

Nickel: Depolarized, less than 100 lb, $1.015; 100-499 lb, 99.50; 500-4999 lb, 95.50; 5000-29,999 lb, 93.50; 30,000 lb, 91.50. Carbonized, deduct 3 cents a lb. All prices eastern delivery, effective Jan. 1, 1955.

Tin: Bar or slab, less than 200 lb, 113.50; 200-499 lb, 112.00; 500-999 lb, 111.50; 1000 lb or more, 111.00.

Zinc: Balls, 21.00; flat tops, 21.00; flats, 22.75; ovals, 22.00, ton lots.

CHEMICALS

Cadmium Oxide: $2.15 per lb, in 100-lb drums.

Chromic Acid: Less than 10,000 lb, 28.50; over 10,000 lb, 27.50.

Copper Cyanide: 100 lb, 85.25; 200 lb, 84.50; 300 lb, 84.25; 400-900 lb, 83.50; 1000 lb, 81.50.

Copper Sulphate: 500-1900 lb, 17.90; 2000-5900 lb, 15.90; 6000 lb or more, 15.65.

Nickel Chloride: 100 lb, 46.50; 200 lb, 44.50; 300 lb, 43.50; 400-4900 lb, 41.50; 5000-9900 lb, 39.5; 10,000 lb and over, 38.50. All prices eastern delivery, effective Jan. 1, 1955.

Nickel Sulphate: 100 lb, 38.25; 200 lb, 36.25; 300 lb, 35.25; 400-4900 lb, 30.35; 5000-35,900 lb, 31.25; 36,000 lb, 30.35. All prices eastern delivery, effective Jan. 1, 1955.

Silver Cyanide: (Cents per ounce) 4-oz bottle, 86.875; 15-oz bottle, 85.625; 80-oz bottle, 83.125; 100-oz bottle, 83.125; f.o.b. St. Louis, New York and Los Angeles. Effective Sept. 30, 1955.

Sodium Cyanide: Egg, under 1000 lb, 19.80; 1000-19,999 lb, 18.80; 20,000 lb and over, 17.80; granular, add 1-cent premium to above.

Sodium Stannate: Less than 100 lb, 68.90; 100-600 lb, 60.70; 700-1900 lb, 58.20; 2000-9900 lb, 56.50; 10,000 lb or more, 55.30.

Stannous Chloride (anhydrous): Less than 25 lb, 165.30; 25 lb, 130.30; 100 lb, 115.30; 400 lb, 112.90; 5200-19,600 lb, 100.70; 20,000 lb or more, 88.50.

Stannous Sulphate: Less than 50 lb, 128.10; 50 lb, 98.10; 100-1900 lb, 96.10; 2000 lb or more, 94.10.

Zinc Cyanide: Under 1000 lb, 54.30; 1000 lb and over, 52.30.

for FAST and SAFE Handling!

This sturdy, fast moving ⅜ yard machine has a lifting capacity up to 16,000 lbs. . . . swings in a full 360° circle. With the New FULL RANGE VISION Cab, the operator can SEE what he is doing, at all times. Promotes greater safety . . . speeds up the job. Other Challenger features include: *Self-aligning, Replaceable Hook Shoes . . . Force Feed Lubrication . . . Full Floating Trunnion-Mounted Tapered Drums . . . Straight-in-Line Engine Mounting with Torque Converter . . . Interchangeability of Parts, etc.*

Unit models are also available in ½ and ¾ yard Excavators . . . Cranes up to 20 tons capacity . . . Crawler or Mobile types . . . Gasoline or Diesel.

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Geared to boost your earnings!

A 8572-55 PC

Steel Prices

Mill prices as reported to STEEL, cents per pound except as otherwise noted. *Changes shown in italics.* Code numbers following mill points indicate producing company. Key to producers, page 105; to footnotes, page 107.

SEMIFINISHED

INGOTS, Carbon, Forging (NT)

Munhall,Pa. U5 ..... $65.50

INGOTS, Alloy (NT)

Detroit R7 ..... $69.00
Houston 85 ..... 74.00
Midland Pa. C18 ..... 69.00
Munhall,Pa. U5 ..... 69.00

BILLETS, BLOOMS & SLABS Carbon, Rerolling (NT)

Aliquippa,Pa. J5 ..... $68.50
Bessemer,Pa. U5 ..... 68.50
Bridgeport,Conn. N19 .. 73.50
Buffalo R2 ..... 68.50
Clairton,Pa. U5 ..... 68.50
Ensley,Ala. T2 ..... 68.50
Fairfield,Ala. T2 ..... 68.50
Fontana,Calif. K1 ..... 78.00
Gary,Ind. U5 ..... 68.50
Johnstown,Pa. B2 ..... 68.50
Lackawanna,N.Y. B2 ..... 68.50
LoneStar,Tex. L6 ..... 74.50
Munhall,Pa. U5 ..... 68.50
Pittsburgh J5 ..... 68.50
S.Chicago,Ill. R2, U5 ..... 68.50
S.Duquesne,Pa. U5 ..... 68.50
Youngstown R2 ..... 68.50

Carbon, Forging (NT)

Aliquippa,Pa. J5 ..... $84.50
Bessemer,Pa. U5 ..... 84.50
Bridgeport,Conn. N19 .. 89.50
Buffalo R2 ..... 84.50
Canton,O. R2 ..... 86.50
Clairton,Pa. U5 ..... 84.50
Conshohocken,Pa. A3 .. 89.50
Ensley,Ala. T2 ..... 84.50
Fairfield,Ala. T2 ..... 84.50
Fontana,Calif. K1 ..... 94.00
Gary,Ind. U5 ..... 84.50
Geneva,Utah C11 ..... 84.50
Houston 85 ..... 101.00
Johnstown,Pa. B2 ..... 84.50
Lackawanna,N.Y. B2 .. 84.50
LosAngeles B3 ..... 94.00
Midland,Pa. C18 ..... 84.50
Munhall,Pa. U5 ..... 84.50
Pittsburgh J5 ..... 84.50
Seattle B3 ..... 98.00
S.Chicago R2,U5,W14 .. 84.50
S.Duquesne,Pa. U5 ..... 84.50
S.SanFrancisco B3 ..... 94.00

Alloy, Forging (NT)

Bethlehem,Pa. B2 ..... $96.00
Buffalo R2 ..... 96.00
Canton,O. R2, T7 ..... 96.00
Conshohocken,Pa. A3 .. 103.00
Detroit R7 ..... 96.00
Fontana,Calif. K1 ..... 117.00
Gary,Ind. U5 ..... 96.00
Houston 85 ..... 105.00
Ind.Harbor,Ind. Y1 ..... 96.00
Johnstown,Pa. B2 ..... 96.00
Lackawanna,N.Y. B2 .. 96.00
LosAngeles B3 ..... 116.00
Massillon,O. R2 ..... 96.00
Midland,Pa. C18 ..... 96.00
Munhall,Pa. U5 ..... 96.00
S.Chicago R2,U5,W14 .. 96.00
S.Duquesne,Pa. U5 .. 96.00
Struthers,O. Y1 ..... 96.00
Warren,O. C17 ..... 96.00

ROUNDS, SEAMLESS TUBE (NT)

Buffalo R2 ..... $103.50
Canton,O. R2 ..... 103.50
Cleveland R2 ..... 103.50
Gary,Ind. U5 ..... 103.50
S.Chicago R2, W14 .. 103.50
S.Duquesne,Pa. U5 .. 103.50

SKELP

Aliquippa,Pa. J5 ..... 4.325
LoneStar,Tex. L6 ..... 4.625
Munhall,Pa. U5 ..... 4.225
SparrowsPoint Md. B2 .. 4.225
Warren,O. R2 ..... 4.225
Youngstown R2, U5 .. 4.225

WIRE RODS

AlabamaCity,Ala. R2 .. 5.375
Aliquippa,Pa. J5 ..... 5.375
Alton,Ill. L1 ..... 5.55
Buffalo W12 ..... 5.375
Cleveland A7 ..... 5.375
Donora,Pa. A7 ..... 5.375
Fairfield,Ala. T2 ..... 5.375
Houston 85 ..... 5.625
IndianaHarbor,Ind. Y1 .. 5.375
Johnstown,Pa. B2 ..... 5.375
Joliet,Ill. A7 ..... 5.375
KansasCity,Mo. 85 ..... 5.625
Kokomo,Ind. C16 ..... 5.475
LosAngeles B3 ..... 6.175
Minnequa,Colo. C10 ... 5.625
Monessen,Pa. P7 ..... 5.375
N.Tonawanda,N.Y. B11 .. 5.375
Pittsburg,Calif. C11 .. 6.025
Portsmouth,O. P12 ... 5.375
Roebling,N.J. R5 ..... 5.475
S.Chicago,Ill. R2 ..... 5.375
SparrowsPoint,Md. B2 .. 5.475
Sterling Ill.(1) N15 ... 5.375
Sterling,Ill. N15 ..... 5.475
Struthers,O. Y1 ..... 5.375
Worcester,Mass. A7 .. 5.675

STRUCTURALS

Carbon Steel Std. Shapes

Ala.City,Ala. R2 ..... 4.60
Aliquippa,Pa. J5 ..... 4.60
Bessemer,Ala. T2 ..... 4.60
Bethlehem,Pa. B2 ..... 4.65
Birmingham C15 ..... 5.10
Clairton,Pa. U5 ..... 4.60
Fairfield,Ala. T2 ..... 4.60
Fontana,Calif. K1 ..... 5.30
Gary,Ind. U5 ..... 4.60
Geneva,Utah C11 ..... 4.60
Houston 85 ..... 4.70
Ind.Harbor,Ind. I-2 ... 4.60
Johnstown,Pa. B2 ..... 4.65
KansasCity,Mo. 85 ..... 4.70
Lackawanna,N.Y. B2 .. 4.65
LosAngeles B3 ..... 5.30
Minnequa,Colo. C10 ... 4.90
Munhall,Pa. U5 ..... 4.60
Niles,Calif. P1 ..... 5.25
Phoenixville,Pa. P4 .... 5.15
Portland Oreg. O4 ..... 5.35
Seattle B3 ..... 5.35
S.Chicago U5, W14 ..... 4.60
S.SanFrancisco B3 ..... 5.25
Torrance,Calif. C11 ... 5.30
Weirton,W.Va. W6 ..... 4.60

Wide Flange

Bethlehem Pa. B2 ..... 4.65
Clairton,Pa. U5 ..... 4.60
Fontana,Calif. K1 ..... 5.45
Lackawanna,N.Y. B2 .. 4.65
Munhall,Pa. U5 ..... 4.60
Phoenixville,Pa. P4 ..... 5.15
S.Chicago,Ill. U5 ..... 4.60

Alloy Std. Shapes

Clairton,Pa. U5 ..... 5.65
Fontana,Calif. K1 ..... 7.40
Gary,Ind. U5 ..... 5.65
Houston 85 ..... 5.75
Munhall,Pa. U5 ..... 5.65
S.Chicago,Ill. U5 ..... 5.65

H.S., L.A. Std. Shapes

Aliquippa,Pa. J5 ..... 6.75
Bessemer,Ala. T2 ..... 6.75
Bethlehem,Pa. B2 ..... 6.80
Clairton,Pa. U5 ..... 6.75
Fairfield,Ala. T2 ..... 6.75
Fontana Calif. K1 ..... 7.45
Gary,Ind. U5 ..... 6.75
Geneva,Utah C11 ..... 6.75
Houston 85 ..... 6.85
Ind.Harbor,Ind. I-2, Y1 .. 6.75
Johnstown,Pa. B2 ..... 6.80
KansasCity,Mo. 85 ..... 6.85
Lackawanna,N.Y. B2 .. 6.80
LosAngeles B3 ..... 7.45
Munhall,Pa. U5 ..... 6.75
Seattle B3 ..... 7.50
S.Chicago,Ill. U5, W14 .. 6.75
S.SanFrancisco B3 ..... 7.40
Struthers,O. Y1 ..... 6.75

H.S., L.A. Wide Flange

Bethlehem,Pa. B2 ..... 6.80
Lackawanna,N.Y. B2 .. 6.80
Munhall,Pa. U5 ..... 6.75
S.Chicago,Ill. U5 ..... 6.75

PILING

BEARING PILES

Bethlehem,Pa. B2 ..... 4.65
Lackawanna,N.Y. B2 .. 4.65
Munhall,Pa. U5 ..... 4.60
S.Chicago,Ill. U5 ..... 4.60

STEEL SHEET PILING

Ind.Harbor,Ind. I-2 ... 5.45
Lackawanna,N.Y. B2 ... 5.45
Munhall,Pa. U5 ..... 5.45
S.Chicago,Ill. U5 ..... 5.45

PLATES

PLATES, Carbon Steel

Ala.City,Ala. R2 ..... 4.50
Aliquippa,Pa. J5 ..... 4.50
Ashland,Ky.(15) A10 .. 4.50
Bessemer,Ala. T2 ..... 4.50
Bridgeport,Conn. N19 .. 4.75
Buffalo R2 ..... 4.50
Clairton,Pa. U5 ..... 4.50
Claymont,Del. C22 .... 5.35
Cleveland J5, R2 ..... 4.60
Coatesville,Pa. L7 ..... 4.80
Conshohocken,Pa. A3 .. 4.50
Detroit M1 ..... 4.60
Ecorse,Mich. G5 ..... 4.60
Fairfield,Ala. T2 ..... 4.50
Fontana,Calif.(30) K1 .. 5.20
Gary,Ind. U5 ..... 4.50
Geneva,Utah C11 ..... 4.50
GraniteCity,Ill. G4 .... 4.70
Harrisburg,Pa. P4 .... 5.10
Houston 85 ..... 4.60
Ind.Harbor,Ind. I-2, Y1 .. 4.50
Johnstown,Pa. B2 ..... 4.50
Lackawanna,N.Y. B2 .. 4.50
LoneStar,Tex. L6 ..... 4.85
Mansfield,O. E6 ..... 4.50
Minnequa,Colo. C10 .... 5.35
Munhall,Pa. U5 ..... 4.50
Newport,Ky. N9 ..... 4.50
Pittsburgh J5 ..... 4.50
Riverdale,Ill. A1 ..... 4.725
Seattle B3 ..... 5.40
Sharon,Pa. S3 ..... 4.50
S.Chicago R2, U5, W14 .. 4.50
SparrowsPoint,Md. B2 .. 4.50
Steubenville,O. W10 .... 4.50
Warren,O. R2 ..... 4.50
Weirton,W.Va. W6 .... 4.50
Youngstown R2, U5, Y1 .. 4.50

PLATES, Carbon Abras. Resist.

Claymont,Del. C22 .... 6.20
Fontana,Calif. K1 .... 6.35
Geneva,Utah C11 ..... 5.65
Johnstown,Pa. B2 ..... 5.65
SparrowsPoint,Md. B2 .. 5.65

PLATES, Wrought Iron

Economy,Pa. B14 ..... 10.40

PLATES, High-Strength Low-Alloy

Aliquippa,Pa. J5 ..... 6.725
Bessemer,Ala. T2 ..... 6.725
Clairton,Pa. U5 ..... 6.725
Cleveland J5, R2 ..... 6.725
Claymont,Del. C22 .... 6.725
Coatesville,Pa. L7 .... 7.025
Conshohocken,Pa. A3 .. 6.725
Ecorse,Mich. G5 ..... 6.825
Fairfield,Ala. T2 ..... 6.725
Fontana,Calif.(30) K1 .. 7.425
Gary,Ind. U5 ..... 6.725
Geneva,Utah C11 ..... 6.725
Houston 85 ..... 6.825
Ind.Harbor,Ind. I-2, Y1 .. 6.725
Johnstown,Pa. B2 ..... 6.725
Munhall,Pa. U5 ..... 6.725
Pittsburgh J5 ..... 6.725
Seattle B3 ..... 7.625
Sharon,Pa. S3 ..... 6.725
S.Chicago Ill. U5, W14 .. 6.725
SparrowsPoint,Md. B2 .. 6.725
Warren,O. R2 ..... 6.725
Youngstown U5, Y1 .... 6.725

PLATES, Alloy

Bridgeport,Conn. N19 .. 6.55
Claymont,Del. C22 .... 6.30
Coatesville,Pa. L7 .... 6.30
Fontana,Calif. K1 .... 7.00
Gary,Ind. U5 ..... 6.30
Houston 85 ..... 6.40
Ind.Harbor,Ind. Y1 .... 6.30
Johnstown,Pa. B2 ..... 6.30
Munhall,Pa. U5 ..... 6.30
Newport,Ky. N9 ..... 6.30
Seattle B3 ..... 7.20
Sharon,Pa. S3 ..... 6.30
S.Chicago Ill. U5, W14 .. 6.30
SparrowsPoint,Md. B2 .. 6.30
Youngstown Y1 ..... 6.30

FLOOR PLATES

Cleveland J5 ..... 5.575
Conshohocken,Pa. A3 .. 5.575
Harrisburg,Pa. P4 .... 5.575
Ind.Harbor,Ind. I-2 .... 5.575
Munhall,Pa. U5 ..... 5.575
S.Chicago,Ill. U5 ..... 5.575

PLATES, Ingot Iron

Ashland c.l. (15) A10 .. 4.75
Ashland l.c.l. (15) A10 .. 5.25
Cleveland c.l. R2 ..... 5.10
Warren,O. c.l. R2 ..... 5.10

BARS

BARS, Hot-Rolled Carbon (Merchant Quality)

Ala.City,Ala.(9) R2 .... 4.65
Aliquippa,Pa.(9) J5 .... 4.65
Alton,Ill. L1 ..... 4.85
Atlanta(9) A11 ..... 5.15
Bessemer,Ala.(9) T2 .... 4.65
Birmingham C15 ..... 5.15
Bridgeport,Conn. N19 .. 4.80
Buffalo(9) R2 ..... 4.65
Canton,O.(9) R2 ..... 4.75
Clairton,Pa.(9) U5 ..... 4.65
Cleveland(9) R2 ..... 4.65
Ecorse,Mich.(9) G5 .... 4.75
Emeryville,Calif. J7 .... 5.40
Fairfield,Ala.(9) T2 .... 4.65
Fairless,Pa.(9) U5 .... 4.80
Fontana,Calif. K1 .... 5.35
Gary,Ind.(9) U5 ..... 4.65
Houston(9) 85 ..... 4.90
Ind.Harbor,Ind.(9) I-2.. 4.65
Ind.Harbor,Ind. Y1 ..... 4.65
Johnstwn,Pa.(9) B2 .... 4.65
Joliet,Ill. P22 ..... 5.15
KansasCity,Mo.(9) 85 .. 4.90
Lackawanna(9) B2 .... 4.65
LosAngeles(9) B3 .... 5.35
Massillon,O.(9) R2 .... 4.75
Midland,Pa.(9) C18 .... 4.65
Milton,Pa. M18 ..... 4.80
Minnequa,Colo. C10 .... 5.10
Niles, Calif. P1 ..... 5.35
N.T'wanda,N.Y.(9) B11 .. 4.65
Pittsburg,Calif.(9) C11 .. 5.35
Pittsburgh(9) J5 ..... 4.65
Portland,Oreg. O4 .... 5.40
Seattle B3, N14 ..... 5.40
S.Chicago W14 ..... 4.65
S.Chicago,Ill.(9) R2, U5 .. 4.65
S.Duquesne,Pa.(9) U5 .. 4.65
S.SanFran.,Calif.(9) B3 .. 5.40
Sterling,Ill.(1) N15 .... 4.65
Sterling,Ill. N15 ..... 4.75
Struthers O. Y1 ..... 4.65
Torrance Calif.(9) C11 .. 5.35
Warren O.(9) R2 ..... 4.65
Weirton,W.Va.(9) W6 .. 4.65
Youngstown(9) R2, U5 .. 4.65

BARS, H.R. Leaded Alloy

Warren,O. C17 ..... 6.575

BARS, Hot-Rolled Alloy

Bethlehem,Pa. B2 .... 5.575
Bridgeport,Conn. N19 .. 5.725
Buffalo R2 ..... 5.575
Canton,O. R2, T7 .... 5.575
Clairton,Pa. U5 ..... 5.575
Detroit R7 ..... 5.575
Ecorse,Mich. G5 ..... 5.675
Fairless,Pa. U5 ..... 5.725
Fontana,Calif. K1 .... 6.625
Gary,Ind. U5 ..... 5.575
Houston 85 ..... 5.825
Ind.Harbor,Ind. I-2, Y1 .. 5.575
Johnstown,Pa. B2 ..... 5.575
KansasCity,Mo. 85 .... 5.825
Lackawanna,N.Y. B2 .. 5.575
LosAngeles B3 ..... 6.625
Massillon,O. R2 ..... 5.575
Midland,Pa. C18 ..... 5.575
S.Chicago R2, U5, W14 .. 5.575
S.Duquesne,Pa. U5 .... 5.575
Struthers,O. Y1 ..... 5.575
Warren,O. C17 ..... 5.575
Youngstown U5 ..... 5.575

BARS & SMALL SHAPES, H.R. High-Strength Low-Alloy

Aliquippa,Pa. J5 ..... 6.80
Bessemer,Ala. T2 ..... 6.80
Bethlehem,Pa. B2 ..... 6.80
Clairton,Pa. U5 ..... 6.80
Cleveland R2 ..... 6.80
Ecorse,Mich. G5 ..... 6.90
Fairfield,Ala. T2 ..... 6.80
Fontana,Calif. K1 .... 7.50
Gary,Ind. U5 ..... 6.80
Houston 85 ..... 7.05
Ind.Harb.,Ind. I-2, Y1.. 6.80
Johnstown,Pa. B2 ..... 6.80
KansasCity,Mo. 85 .... 7.05
Lackawanna,N.Y. B2 .. 6.80
LosAngeles B3 ..... 7.50
Pittsburgh J5 ..... 6.80
Seattle B3 ..... 7.55
S.Chicago W14 ..... 6.80
S.Duquesne,Pa. U5 .... 6.80
S.SanFrancisco B3 .... 7.55
Struthers,O. Y1 ..... 6.80
Warren,O. R2 ..... 6.80
Youngstown U5 ..... 6.80

BAR SIZE ANGLES; H.R. Carbon

Bethlehem,Pa.(9) B2 .. 4.80
Lackawanna(9) B2 .... 4.65

BAR SIZE ANGLES; S. Shapes

Aliquippa,Pa. J5 ..... 4.65
Atlanta A11 ..... 5.15
Fontana,Calif. K1 .... 5.35
Joliet,Ill. P22 ..... 5.10
Niles,Calif. P1 ..... 5.35
Pittsburgh J5 ..... 4.65
Portland,Oreg. O4 .... 5.40
SanFrancisco B7 ..... 5.65

BAR SHAPES, Hot-Rolled Alloy

Clairton,Pa. U5 ..... 5.65
Gary,Ind. U5 ..... 5.65
Houston 85 ..... 5.90
KansasCity,Mo. 85 .... 5.90
Youngstown U5 ..... 5.65

BARS, C.F. Loaded Alloy

Ambridge,Pa. W18 .... 8.325
Camden,N.J. P13 ..... 8.35
Chicago W18 ..... 8.325
Cleveland C20 ..... 8.325
Monaca,Pa. B17 ..... 8.325
Newark,N.J. W18 .... 8.50
SpringCity,Pa. K3 .... 8.30
Warren,O. C17 ..... 8.575

BARS, Cold-Finished Carbon

Ambridge,Pa. W18 .... 6.25
BeaverFalls,Pa. M12,R2 6.25
Buffalo B5 ..... 6.30
Camden,N.J. P13 ..... 6.70
Carnegie,Pa. C12 ..... 6.25
Chicago W18 ..... 6.25
Cleveland A7, C20 .... 6.25
Detroit B5, P17 ..... 6.45
Detroit R7 ..... 6.25
Donora,Pa. A7 ..... 6.25
Elyria,O. W8 ..... 6.25
FranklinPark,Ill. N5 .... 6.25
Gary,Ind. R2 ..... 6.25
GreenBay,Wis. F7 ..... 6.25
Hammond,Ind. L2, M13 .. 6.25
Hartford,Conn. R2 .... 6.75
Harvey,Ill. B5 ..... 6.25
LosAngeles(49) S30 .... 7.70
LosAngeles R2 ..... 7.70
Mansfield,Mass. B5 .... 6.80
Massillon,O. R2, R8 .... 6.25
Midland,Pa. C18 ..... 6.25
Monaca,Pa. S17 ..... 6.25
Newark,N.J. W18 .... 6.70
NewCastle,Pa.(17) B4 .. 6.25
Pittsburgh J5 ..... 6.25
Plymouth,Mich. P5 .... 6.50
Putnam,Conn. W18 .... 6.80
Readville,Mass. C14 .... 6.80
S.Chicago Ill. W14 .... 6.25
SpringCity Pa. K3 .... 6.70
Struthers,O. Y1 ..... 6.25
Waukegan,Ill. A7 ..... 6.25
Worcester,Mass. W19 .. 6.70
Youngstown F3, Y1 .... 6.25

BARS, Cold-Finished Carbon (Turned and Ground)

Cumberland,Md.(5) C19 5.15

BARS, Cold-Finished Alloy

Ambridge,Pa. W18 .... 7.425
BeaverFalls,Pa. M12,R2 7.425
Bethlehem,Pa. B2 ..... 7.425
Buffalo B5 ..... 7.425
Camden,N.J. P13 ..... 7.60
Canton,O. T7 ..... 7.425
Carnegie,Pa. C12 ..... 7.425
Chicago W18 ..... 7.425
Cleveland A7, C20 .... 7.425
Detroit R7 ..... 7.425
Detroit B5, P17 ..... 7.625
Donora,Pa. A7 ..... 7.425
Elyria,O. W8 ..... 7.425
Gary,Ind. R2 ..... 7.425
GreenBay,Wis. F7 ..... 7.425
Hammond,Ind. L2, M13 7.425
Hartford Conn. R2 .... 7.725
Harvey,Ill. B5 ..... 7.425
Lackawanna,N.Y. B2 .. 7.425
LosAngeles S30 ..... 9.10
Mansfield,Mass. B5 .. 7.725
Massillon,O. R2, R8 .... 7.425
Midland,Pa. C18 ..... 7.425
Monaca,Pa. S17 ..... 7.425
Newark,N.J. W18 ..... 7.60
Plymouth,Mich. P5 .... 7.625
S.Chicago W14 ..... 7.425
SpringCity,Pa. K3 .... 7.60
Struthers,O. Y1 ..... 7.425
Warren,O. C17 ..... 7.425
Waukegan,Ill. A7 ..... 7.425
Worcester,Mass. A7 .. 7.725
Youngstown F3, Y1 .... 7.425

BARS, Reinforcing (To Fabricators)

Ala.City,Ala. R2 ..... 4.65
Atlanta A11 ..... 5.15
Birmingham C15 ..... 5.15
Buffalo R2 ..... 4.65
Cleveland R2 ..... 4.65
Ecorse,Mich. G5 ..... 4.75
Emeryville,Calif. J7 .... 5.40
Fairfield,Ala. T2 ..... 4.65
Fairless,Pa. U5 ..... 4.80
Fontana,Calif. K1 ..... 5.35
Ft.Worth,Tex.(42) T4 .. 5.10
Gary,Ind. U5 ..... 4.65
Houston 85 ..... 4.90

Ind.Harbor,Ind. I-2, Y1 .4.65
Johnstown,Pa. B2 ....4.65
Joliet,Ill. P22 .....5.15
KansasCity,Mo. S5 ....4.90
Lackawanna,N.Y. B2 ..4.65
LosAngeles B3 .....5.35
Milton,Pa. M18 .....4.80
Minnequa,Colo. C10 ....5.10
Niles,Calif. P1 .....5.35
Pittsburg,Calif. C11 ....5.35
Pittsburgh J5 .....4.65
Portland,Oreg. O4 .....5.40
SandSprings,Okla. S5 ..5.15
Seattle B3, N14 .....5.40
S.Chicago R2 .....4.65
S.Duquesne,Pa. U5 ....4.65
S.SanFrancisco B3 ....5.40
SparrowsPoint,Md. B2 ..4.65
Sterling,Ill.(1) N15 ....4.65
Sterling Ill. N15 .....4.75
Struthers,O. Y1 .....4.65
Torrance,Calif. C11 ....5.35
Youngstown R2, U5 ....4.65

BARS, Reinforcing
(Fabricated; to Consumers)

Johnstown,Pa. ¼-1" B2.6.15
KansasCity,Kans. S5 ...6.45
Lackawanna,N.Y. B2 ..6.17
Marion,O. P11 .....6.15
Pittsburgh U8 .....6.17
Seattle B3, N14 .....6.60
SparrowsPt. ¼-1" B2 ..6.15
Williamsport,Pa. S19 ..6.00

RAIL STEEL BARS

ChicagoHts.(3) C2, I-2..4.65
ChicagoHts.(4) C2, I-2..4.65
Ft.Worth,Tex.(26) T4 ..5.10
Franklin,Pa.(3) F5 ....4.65
Franklin,Pa.(4) F5 ....4.65
JerseyShore,Pa.(4) J8 ..4.65
Marion,O.(3) P11 .....4.65
Moline,Ill.(3) R2 .....4.80
Tonawanda(3) B12 ....5.15
Tonawanda(4) B12 ....5.15
Williamsport,Pa.(3) S19.4.65

BARS, Wrought Iron

Economy,Pa.(B.R.)B14 11.50
Economy,Pa.(D.R.)B14 14.30
Economy(Staybolt)B14 .14.65
McK.Rks.(S.R.) L5 ...11.50
McK.Rks.(D.R.) L5 ...16.00
McK.Rks.(Staybolt) L5.17.00

SHEETS

SHEETS, Hot-Rolled Steel
(18 Gage and Heavier)

Ala.City,Ala. R2 .....4.325
Allenport,Pa. P7 .....4.325
Ashland,Ky.(8) A10 ...4.325
Cleveland J5, R2 .....4.325
Conshohocken,Pa. A3 ..4.375
Detroit(8) M1 .....4.425
Dravosburg,Pa. U5 ....4.325
Ecorse,Mich. G5 .....4.425
Fairfield,Ala. T2 .....4.325
Fairless,Pa. U5 .....4.375
Fontana,Calif. K1 ....5.125
Gary,Ind. U5 .....4.325
Geneva,Utah C11 .....4.425
GraniteCity,Ill. G4 ....4.525
Ind.Harbor,Ind. I-2, Y1.4.325
Lackawanna,N.Y. B2 ..4.325
Mansfield,O. E6 (37) ..4.325
Munhall,Pa. U5 .....4.325
Newport,Ky.(8) N9 ....4.325
Niles,O. M21 .....4.325
Pittsburg,Calif. C11 ...5.025
Pittsburgh J5 .....4.325
Portsmouth,O. P12 ....4.325
Riverdale,Ill. A1 .....4.55
Sharon,Pa. S3 .....4.325
S.Chicago,Ill. W14 ....4.325
SparrowsPoint,Md. B2..4.325
Warren,O. R2 .....4.325
Weirton,W.Va. W6 ....4.325
Youngstown U5, Y1 ...4.325

SHEETS, H.R., (19 Ga. & Lighter)

Ala.City,Ala. R2 .....5.625
Niles,O. M21 .....5.325

SHEETS, H.R. Alloy

Dravosburg,Pa. U5 ....7.20
Gary,Ind. U5 .....7.20
Ind.Harbor,Ind. Y1 ....7.20
Youngstown Y1, U5 ....7.20

SHEETS, H.R. (14 Ga. & Heavier)
High-Strength Low-Alloy

Cleveland J5, R2 .....6.375
Conshohocken,Pa. A3 ..6.425
Dravosburg,Pa. U5 ....6.375
Ecorse,Mich. G5 .....6.475
Fairfield,Ala. T2 .....6.375
Fairless,Pa. U5 .....6.425
Fontana,Calif. K1 ....7.175
Gary,Ind. U5 .....6.375
Ind.Harbor,Ind. I-2, Y1.6.375
Lackawanna(35) B2 ..6.375
Munhall,Pa. U5 .....6.375
Pittsburgh J5 .....6.375
Sharon,Pa. S3 .....6.375
S.Chicago,Ill. U5 .....6.375
SparrowsPoint(36) B2..6.375
Warren,O. R2 .....6.375
Youngstown U5, Y1 ...6.375

SHEETS, Hot-Rolled Ingot Iron
(18 Gage and Heavier)

Ashland,Ky.(8) A10 ...4.575
Ind.Harbor,Ind. I-2 ...4.575

SHEETS, Cold-Rolled Steel
(Commercial Quality)

Allenport,Pa. P7 .....5.325
Cleveland J5, R2 .....5.325
Conshohocken,Pa. A3 ..5.375
Dravosburg,Pa. U5 ....5.325
Detroit M1 .....5.325
Ecorse,Mich. G5 .....5.425
Fairfield,Ala. T2 .....5.325
Fairless,Pa. U5 .....5.375
Follansbee,W.Va. F4 ..5.325
Fontana,Calif. K1 ....6.525
Gary,Ind. U5 .....5.325
GraniteCity,Ill. G4 ....5.525
Ind.Harbor,Ind. I-2, Y1.5.325
Lackawanna,N.Y. B2 ..5.325
Mansfield,O. E6 .....5.325
Middletown,O. A10 ....5.325
Newport,Ky. N9 .....5.325
Pittsburg,Calif. C11 ..6.275
Pittsburgh J5 .....5.325
Portsmouth,O. P12 ....5.325
SparrowsPoint,Md. B2..5.325
Steubenville,O. W10....5.325
Warren,O. R2 .....5.325
Weirton,W.Va. W6 ....5.325
Youngstown Y1 .....5.325

SHEETS, Cold-Rolled
High-Strength Low-Alloy

Cleveland J5, R2 .....7.875
Dravosburg,Pa. U5 ....7.875
Ecorse,Mich. G5 .....7.975
Fairless,Pa. U5 .....7.925
Fontana,Calif. K1 ....9.075
Gary,Ind. U5 .....7.875
IndianaHarbor,Ind. Y1.7.875
Lackawanna(37) B2 ..7.875
Pittsburgh J5 .....7.875
SparrowsPoint(38) B2..7.875
Warren,O. R2 .....7.875
Weirton W.Va. W6 ....7.875
Youngstown Y1 .....7.875

SHEETS, Cold-Rolled Ingot Iron

Middletown,O. A10 ....5.825

SHEETS, Culvert	Cu Alloy	Cu Fe
Ashland,Ky. A10	6.20	6.45
Canton,O. R2	6.10	6.55
Dravosburg U5	6.10	...
Fairfield T2	6.10	...
Gary,Ind. U5	6.10	6.35
Ind.Harbor I-2	6.10	6.35
Kokomo,Ind. C16	6.20	...
MartinsFry. W10	6.10	...
Newport,Ky. N9	6.10	6.35
Pitts.,Calif. C11	6.85	...
SparrowsPt. B2	6.10	...

SHEETS, Culvert—Pure Iron

Gary,Ind. U5 .....6.35
MartinsFry,O. W10 ....6.35

SHEETS, Galvanized Steel
Hot-Dipped

Ala.City,Ala. R2 .....5.85†
Ashland,Ky. A10 .....5.85†
Canton,O. R2 .....5.85†
Dover,O. R1 .....5.85†
Dravosburg,Pa. U5 ....5.85†
Fairfield,Ala. T2 .....5.85†
Gary,Ind. U5 .....5.85*
GraniteCity,Ill. G4 ....6.05
Ind.Harbor,Ind. I-2 ...5.85†
Kokomo,Ind. C16 ....5.95†
MartinsFerry,O. W10 ..5.85*
Middletown,O. A10 ....5.85†
Newport,Ky. N9 .....5.85†
Pittsburg Calif. C11 ...6.60*
Pittsburgh J5 .....5.85†
SparrowsPt.,Md. B2 ...5.85†
Warren,O. R2 .....5.85†
Weirton,W.Va. W6 ...5.85*

*Continuous and noncontinuous. †Continuous. ‡Noncontinuous.

SHEETS, Wall Casing

Fontana,Calif. K1 ....6.625

SHEETS, Galvanized
High-Strength Low-Alloy

Dravosburg,Pa. U5 ....8.60
SparrowsPoint(39) B2 ..8.60

SHEETS, Galvannealed Steel

Canton,O. R2 .....6.25
Dravosburg,Pa. U5 ....6.25
Kokomo,Ind. C16 .....6.60
Newport,Ky. N9 .....6.25

SHEETS, Galvanized Ingot Iron
(Hot-dipped Continuous)

Ashland,Ky. A10 .....6.10
Middletown,O. A10 ....6.10

SHEETS, Electrogalvanized

Cleveland(28) R2 .....6.70
Niles,O.(28) R2 .....6.70
Weirton,W.Va. W6 ....6.55

SHEETS, Aluminum Coated

Butler,Pa. A10 (type 1).8.50
Butler,Pa. A10 (type 2).8.60

SHEETS, Enameling Iron

Ashland,Ky. A10 .....5.90
Cleveland R2 .....5.90
Dravosburg,Pa. U5 ....5.90
Gary,Ind. U5 .....5.90
GraniteCity,Ill. G4 ....6.10
Ind.Harbor,Ind. I-2 ....5.90
Middletown,O. A10 ....5.90
Niles,O. M21 .....5.90
Youngstown Y1 .....5.90

BLUED STOCK, 29 Gage

Follansbee,W.Va. F4 ...7.75
Ind.Harbor,Ind. I-2 ....7.75
Yorkville,O. W10 .....7.75

SHEETS, Long Terne Steel
(Commercial Quality)

BeechBottom,W.Va. W10 6.25
Gary,Ind. U5 .....6.25
Mansfield,O. E6 .....6.25
Middletown,O. A10 ....6.25
Niles,O. M21 .....6.25
Weirton,W.Va. W6 ....6.25

SHEETS, Long Terne, Ingot Iron

Middletown,O. A10 ....6.65

Key To Producers

A1 Acme Steel Co.
A3 Alan Wood Steel Co.
A4 Allegheny Ludlum Steel
A5 Alloy Metal Wire Div., H. K. Porter Co. Inc.
A6 American Rhim Steel Co.
A7 American Steel & Wire Div., U. S. Steel Corp.
A8 Anchor Drawn Steel Co.
A9 Angell Nail & Chaplet
A10 Armco Steel Corp.
A11 Atlantic Steel Co.

B1 Babcock & Wilcox Co.
B2 Bethlehem Steel Co.
B3 Beth. Pac. Coast Steel
B4 Blair Strip Steel Co.
B5 Bliss & Laughlin Inc.
B8 Braeburn Alloy Steel
B9 Brainard Steel Div., Sharon Steel Corp.
B10 E. & G. Brooke, Wickwire Spencer Steel Div. Colo. Fuel & Iron
B11 Buffalo Bolt Co., Div., Buffalo-Eclipse Corp.
B12 Buffalo Steel Corp.
B14 A. M. Byers Co.
B15 J. Bishop & Co.

C1 Calstrip Steel Corp.
C2 Calumet Steel Div. Borg-Warner Corp.
C4 Carpenter Steel Co.
C7 Cleve. Cold Rolling Mills
C8 Cold Metal Products Co.
C9 Colonial Steel Co.
C10 Colorado Fuel & Iron
C11 Columbia-Geneva Steel
C12 Columbia Steel & Shaft.
C13 Columbia Tool Steel Co.
C14 Compressed Steel Shaft.
C15 Connors Steel Div. H. K. Porter Co. Inc.
C16 Continental Steel Corp.
C17 Copperweld Steel Co.
C18 Crucible Steel Co.
C19 Cumberland Steel Co.
C20 Cuyahoga Steel & Wire
C22 Claymont Steel Products Dept. Wickwire Spencer Steel Division
C23 Charter Wire Inc.
C24 G. O. Carlson Inc.

D2 Detroit Steel Corp.
D3 Detroit Tube & Steel Div., Sharon Steel Corp.
D4 Diaston & Sons, Henry
D6 Driver-Harris Co.
D7 Dickson Weatherproof Nail Co.
D8 Damascus Tube Co.
D9 Wilbur B. Driver Co.

E1 Eastern Gas&Fuel Assoc.
E2 Eastern Stainless Steel
E4 Electro Metallurgical Co.
E5 Elliott Bros. Steel Co.
E6 Empire Steel Corp.

F2 Firth Sterling Inc.
F3 Fitzsimmons Steel Co.
F4 Follansbee Steel Corp.
F5 Franklin Steel Div. Borg-Warner Corp.
F6 Fretz-Moon Tube Co.
F7 Ft. Howard Steel & Wire
F8 Ft. Wayne Metals Inc.

G2 Globe Iron Co.
G4 Granite City Steel Co.
G5 Great Lakes Steel Corp.
G6 Greer Steel Co.

H1 Hanna Furnace Corp.
H7 Helical Tube Co.

I-1 Igoe Bros. Inc.
I-2 Inland Steel Co.
I-3 Interlake Iron Corp.
I-4 Ingersoll Steel Div., Borg-Warner Corp.
I-6 Ivins, E., Steel Tube
I-7 Indiana Steel & Wire Co.

J1 Jackson Iron & Steel Co.
J3 Jessop Steel Co.
J4 Johnson Steel & Wire Co.
J5 Jones & Laughlin Steel
J6 Joslyn Mfg. & Supply
J7 Judson Steel Corp.
J8 Jersey Shore Steel Co.

K1 Kaiser Steel Corp.
K2 Keokuk Electro-Metals
K3 Keystone Drawn Steel
K4 Keystone Steel & Wire
K7 Kenmore Metals Corp.

L1 Laclede Steel Co.
L2 LaSalle Steel Co.
L3 Latrobe Steel Co.
L5 Lockhart Iron & Steel
L6 Lone Star Steel Co.
L7 Lukens Steel Co.

M1 McLouth Steel Corp.
M4 Mahoning Valley Steel
M6 Mercer Pipe Div., Sawhill tubular Products
M8 Mid-States Steel & Wire
M12 Moltrup Steel Products
M13 Monarch Steel Div., Jones & Laughlin Steel Corp.
M14 McInnes Steel Co.
M16 Md. Fine&Special. Wire
M17 Metal Forming Corp.
M18 Milton Steel Prod., Div., Merritt-Chapman&Scott
M21 Mallory-Sharon Titanium Corp.

N1 National-Standard Co.
N2 National Supply Co.
N3 National Tube Div., U. S. Steel Corp.
N5 Nelsen Steel & Wire Co.
N6 New Eng. High Carb. Wire
N8 Newman-Crosby Steel
N9 Newport Steel Corp.
N14 Northwest.SteelRoll Mills
N15 Northwestern S.&W. Co.
N16 New Delphos Mfg. Co.
N19 Northeastern Steel Corp.
O3 Oliver Iron & Steel Corp.
O4 Oregon Steel Mills

P1 PacificStatesSteelCorp.
P2 Pacific Tube Co.
P4 Phoenix Iron & Steel Co. Sub. of Barium Steel Corp.
P5 Pilgrim Drawn Steel
P6 Pittsburgh Coke&Chem.
P7 Pittsburgh Steel Co.
P11 Pollak Steel Co.
P12 Portsmouth Division, Detroit Steel Corp.
P13 Precision Drawn Steel
P14 Pitts. Screw & Bolt Co.
P15 Pittsburg Metallurgical
P16 Page Steel & Wire Div., Amer. Chain & Cable
P17 Plymouth Steel Co.
P19 Pitts. Rolling Mills
P20 Prod. Steel Strip Corp.
P22 Phoenix Mfg. Co.

R1 Reeves Steel & Mfg. Co.
R2 Republic Steel Corp.
R3 Rhode Island Steel Corp.
R5 Roebling's Sons, John A.
R6 Rome Strip Steel Co.
R7 Rotary Electric Steel Co.
R8 Reliance Div.,Eaton Mfg.
R9 Rome Mfg. Co.
R10 Rodney Metals Inc.

S1 Seneca Wire & Mfg. Co.
S3 Sharon Steel Corp.
S4 Sharon Tube Co.
S5 Sheffield Steel Div., Armco Steel Corp.
S6 Shenango Furnace Co.
S7 Simmons Co.
S8 Simonds Saw & Steel Co.
S12 Spencer Wire Corp.
S13 Standard Forgings Corp.
S14 Standard Tube Co.
S15 Stanley Works
S17 Superior Drawn Steel Co.
S18 Superior Steel Corp.
S19 Sweet's Steel Co.
S20 Southern States Steel
S23 Superior Tube Co.
S25 Stainless Welded Prod.
S26 Specialty Wire Co. Inc.
S30 Sierra Drawn Steel Corp.
S40 Seneca Steel Service

T2 Tenn. Coal & Iron Div., U. S. Steel Corp.
T3 Tenn. Prod. & Chem.
T4 Texas Steel Co.
T5 Thomas Strip Division, Pittsburgh Steel Co.
T6 Thompson Wire Co.
T7 Timken Roller Bearing
T9 Tonawanda Iron Div. Am. Rad. & Stan. San.
T13 Tube Methods Inc.

U4 Universal-Cyclops Steel
U5 United States Steel Corp.
U6 U. S. Pipe & Foundry
U7 Ulbrich Stainless Steels
U8 U. S. Steel Supply Div. U. S. Steel Corp.

V2 Vanadium-Alloys Steel
V3 Vulcan Crucible Div., H. K. Porter Co. Inc.

W1 Wallace Barnes Co.
W2 Wallingford Steel Co.
W3 Washburn Wire Co.
W4 Washington Steel Corp.
W6 Weirton Steel Co.
W7 W. Va. Steel & Mfg. Co.
W8 Western Automatic Machine Screw Co.
W9 Wheatland Tube Co.
W10 Wheeling Steel Corp.
W12 Wickwire Spencer Steel Div., Colo. Fuel & Iron
W13 Wilson Steel & Wire Co.
W14 Wisconsin Steel Div., International Harvester
W15 Woodward Iron Co.
W18 Wyckoff Steel Co.
W19 Worcester Pressed Steel

Y1 Youngstown Sheet&Tube

STRIP

STRIP, Hot-Rolled Carbon

Ala.City,Ala.(27) R2	4.325
Allenport,Pa. P7	4.325
Alton,Ill. L1	4.50
Ashland Ky.(8) A10	4.325
Atlanta A11	4.525
Bessemer,Ala. T2	4.325
Birmingham C15	4.825
Bridgeport Conn. N19	4.625
Buffalo(27) H3	4.325
Conshohocken,Pa. A3	4.375
Detroit M1	4.425
Ecorse Mich. G5	4.425
Fairfield, Ala. T2	4.325
Fontana,Calif. K1	5.125
Gary,Ind. U5	4.325
Ind.Harbor,Ind. I-2,Y1	4.325
Johnstown,Pa.(25) B2	4.325
Lackaw'na,N.Y.(24) B2	4.325
LosAngeles (25) B3	5.075
Milton,Pa. M18	4.325
Minnequa,Colo. C10	5.425
Pittsburg Calif. C11	5.075
Riverdale,Ill. A1	4.55
SanFrancisco S7	5.06
Seattle(25) B3	5.325
Seattle N14	5.40
Sharon Pa. S3	4.325
S.Chicago,Ill W14	4.325
S.SanFrancisco(25) B3	5.075
SparrowsPoint,Md. B2	4.325
Sterling(1) N15	4.325
Sterling,Ill. N15	4.425
Torrance,Calif. C11	5.075
Warren,O. R2	4.325
Weirton,W.Va. W6	4.325
Youngstown U5	4.325

High-Strength Low-Alloy

Bridgeport,Conn. N19	7.56
Carnegie,Pa. S18	7.20
Fontana,Calif. K1	8.95
Gary,Ind. U5	7.20
Ind.Harbor,Ind. Y1	7.20
LosAngeles B3	8.40
Newport,Ky. N9	7.20
Sharon,Pa. S3	7.20
S.Chicago W14	7.20
Youngstown U5, Y1	7.20

STRIP, Hot-Rolled High-Strength Low-Alloy

Bessemer,Ala. T2	6.425
Conshohocken,Pa. A3	6.425
Ecorse,Mich. G5	6.525
Fairfield,Ala. T2	6.425
Fontana,Calif. K1	7.575
Gary,Ind. U5	6.425
Houston S5	6.675
Ind.Harbor Ind. I-2,Y1	6.425
KansasCity,Mo. S5	6.675
Lackawanna,N.Y. B2	6.425
LosAngeles(25) B3	7.175
Seattle(25) B3	7.425
Sharon,Pa. S3	6.425
S.SanFrancisco(25) B3	7.175
SparrowsPoint,Md. B2	6.425
Warren O. R2	6.425
Weirton,W.Va. W6	6.425
Youngstown U5, Y1	6.425

STRIP, Hot-Rolled Ingot Iron

Ashland,Ky.(8) A10	4.875

STRIP, Cold-Rolled Carbon

Anderson,Ind. G6	6.25
Baltimore T6	6.25
Boston T6	6.80
Buffalo S40	6.25
Cleveland A7, J5	6.25
Conshohocken,Pa. A3	6.30
Dearborn,Mich. D3	6.35
Detroit D2, M1, P20	6.35
Dover,O G6	6.25
Ecorse,Mich. G5	6.35
Follansbee,W.Va. F4	6.25
Fontana,Calif. K1	8.00
FranklinPark,Ill. T6	6.35
IndHarbor,Ind. I-2	6.35
Ind.Harbor,Ind. Y-1	6.25
Indianapolis C8	6.40
Lackawanna,N.Y. B2	6.25
LosAngeles C1	8.30
NewBedford,Mass. R10,	6.70
NewBritain(16) S15	6.25
NewCastle,Pa. B4, E5	6.25
New Haven,Conn. A7 D2	6.70
NewKensington,Pa. A6,	6.25
Pawtucket,R.I. R3	6.90
Pawtucket,R.I. N8	6.80
Pittsburgh J5	6.25
Riverdale,Ill. A1	6.35
Rome,N.Y. (32) R6	6.25
Sharon,Pa. S3	6.25
SparrowsPt.,Md. B2	6.25
Trenton,N.J.(31) R5	7.80
Wallingford,Conn. W2	6.70
Warren,O. R2 T5	6.25
Weirton,W.Va. W6	6.25
Worcester,Mass. A7	6.80
Youngstown C8, Y1	6.25

STRIP, Cold-Rolled Alloy

Boston T6	13.80
Carnegie,Pa. S18	13.45
Cleveland A7	13.45
Dover,O. G6	13.45
FranklinPark,Ill. T6	13.45
Harrison,N.J. C18	13.45
Indianapolis C8	13.60
Pawtucket,R.I. N8	13.80
Sharon,Pa. S3	13.45
Worcester,Mass. A7	13.75
Youngstown C8	13.45

STRIP, Cold-Rolled High-Strength, Low-Alloy

Cleveland A7	9.10
Dearborn,Mich. D3	9.20
Dover,O. G6	9.30
Ecorse,Mich. G5	9.20
Ind.Harbor,Ind. Y1	9.30

STRIP, Cold-Finished Spring Steel (Annealed)

	0.26-0.40C	0.41-0.60C	0.61-0.80C	0.81-1.05C	1.06-1.35C
Baltimore T6	7.40	9.35	10.90	13.05	15.75
Boston T6	7.65	9.35	10.90	13.05	15.75
Bristol,Conn. W1	...	...	10.90	13.05	15.75
Carnegie,Pa. S18	...	9.05	10.60	12.75	....
Cleveland A7	7.10	9.05	10.60	12.75	15.45
Cleveland C7	...	9.05	10.60	12.75	15.45
Dearborn,Mich. D3	7.20	9.15	10.70	....	....
Detroit D2	7.20	9.15	10.70	12.85	....
Dover,O. G6	7.10	9.05	10.60	12.75	15.45
FranklinPark,Ill. T6	7.20	9.05	10.60	12.75	15.45
Harrison,N.J. C18	...	...	10.90	13.05	15.75
Indianapolis C8	7.25	9.20	10.60	12.75	15.45
NewBritain,Conn.(16) S15	7.10	9.05	10.60	12.75	15.45
NewCastle,Pa. B4, E5	7.10	9.05	10.60	12.75	....
NewHaven,Conn. D2	7.55	9.35	10.90	13.05	....
NewKensington,Pa. A6	7.10	9.05	10.60	....	....
NewYork W3	...	9.35	10.90	13.05	15.75
Pawtucket,R.I. N8	7.65	9.35	10.90	13.05	15.75
Riverdale,Ill. A1	7.20	9.05	10.60	12.75	15.45
Rome,N.Y.(32) R6	7.10	9.05	10.60	12.75	15.45
Sharon,Pa. S3	7.10	9.05	10.60	12.75	15.45
Trenton,N.J. R5	...	9.35	10.90	13.05	15.75
Wallingford,Conn. W2	7.55	9.35	10.90	13.05	15.75
Warren,O. T5	7.10	9.05	10.60	12.75	15.45
Weirton,W.Va. W6	7.10	9.05	10.60	12.75	15.45
Worcester,Mass. A7, T6	7.65	9.35	10.90	13.05	15.75
Youngstown C8	7.10	9.05	10.60	12.75	15.45

Spring Steel (Tempered)

Bristol,Conn. W1	...	...	14.80	18.15	....
Buffalo W12	...	...	14.80	....	....
FranklinPark,Ill. T6	...	...	15.15	18.50	22.35
Harrison,N.J. C18	...	...	14.80	18.15	22.00
NewYork W3	...	...	14.80	18.15	22.00
Trenton N.J. R5	...	...	14.80	18.15	22.00
Worcester,Mass. W12	...	...	14.80	....	....
Worcester,Mass. A7, T6	...	...	14.80	18.15	22.00
Youngstown C8	...	...	15.15	18.50	22.35

SILICON STEEL

H.R. SHEETS (22 Ga., cut lengths)	Field	Armature	Electric	Motor	Dynamo
BeechBottom,W.Va. W10	...	...	9.95	10.95	11.85
Brackenridge,Pa. A4	...	...	9.95	10.95	11.85
Mansfield,O. E6	8.40	9.35	9.95	10.95	11.85
Newport,Ky. N9	8.40	9.35	9.95	10.95	11.85
Niles,O. M21	8.40	9.35	9.95	10.95	....
Vandergrift,Pa. U5	...	9.35	9.95	10.95	11.85
Warren,O. R2	8.40	9.35	9.95	10.95	11.85
Zanesville,O. A10	...	9.35	9.95	10.95	11.85

C.R. COILS & CUT LENGTHS, (22 Ga.)

Fully Processed (Semiprocessed ½c lower)	Field	Armature	Electric	Motor	Dynamo
Brackenridge,Pa. A4	....	....	10.70	11.70	12.60
GraniteCity,Ill. G4	8.80*	9.80*	10.10*	11.40*	....
IndianaHarbor,Ind. I-2	8.60†	9.60*	10.20*	11.20*	....
Vandergrift,Pa. U5	8.60*	9.60*	10.20*	11.20*	12.10*
Vandergrift,Pa. U5	....	10.10†	10.70†	11.70†	12.60†
Warren,O. R2	8.60†	10.10	10.70	11.70	12.60

H.R. SHEETS (22 Ga., cut lengths)	Transformer Grade T-72	T-65	T-58	T-52
BeechBottom,W.Va. W10	12.80	13.35	13.85	14.85
Brackenridge,Pa. A4	12.80	....	....	....
Newport,Ky. N9	12.80	....	....	....
Vandergrift,Pa. U5	12.80	13.35	13.85	14.85
Zanesville,O. A10	12.80‡	13.35‡	13.85‡	14.85‡

C.R. COILS & CUT LENGTHS (22 Ga.)	Grain Oriented T-100	T-90	T-80	T-73	T-66	T-72
Brackenridge,Pa. A4	....	15.85	17.45	17.95	18.45	13.55**
Butler,Pa. A10	....	....	....	17.45	17.95	....
Vandergrift,Pa. U5	14.85	15.85	17.45	17.95	....	13.55
Warren,O. R2	....	....	....	....	....	13.55‡

*Semiprocessed. †Fully processed only. ‡Coils, annealed, semiprocessed ½c lower. §Coils, ¾-cent higher. **Cut lengths, ¾-cent lower.

STRIP, Electrogalvanized

Cleveland A7	6.25*
Dover,O. G6	6.25*
Riverdale,Ill. A1	6.35*
Warren,O. B9, T5	6.25*
Worcester,Mass. A7	6.80*
Youngstown C8	6.25*

*Plus galvanizing extras.

STRIP, Galvanized (Continuous)

Sharon, Pa. S3	6.55

TIGHT COOPERAGE HOOP

Atlanta A11	5.05
Riverdale,Ill. A1	4.90
Sharon,Pa. S3	4.75
Youngstown U5	4.75

TIN MILL PRODUCTS

TIN PLATE Electrolytic (Base Box)	0.25 lb	0.50 lb	0.75 lb
Aliquippa,Pa. J5	$8.30	$8.55	$8.95
Dravosburg,Pa. U5	8.30	8.55	8.95
Fairfield,Ala. T2	8.40	8.65	9.05
Fontana,Calif. K1	9.05	9.30	9.70
Fairless Pa. U5	8.40	8.65	9.05
Gary,Ind. U5	8.30	8.55	8.95
GraniteCity,Ill. G4	8.40	8.65	9.05
IndianaHarbor,Ind. I-2, Y1	8.30	8.55	8.95
Niles,O. R2	8.30	8.55	8.95
Pittsburg,Calif. C11	9.05	9.30	9.70
SparrowsPoint,Md. B2	8.40	8.65	9.05
Weirton,W.Va. W6	8.30	8.55	8.95
Yorkville,O. W10	8.30	8.55	8.95

ELECTROTIN (22-27 Gage; Dollars per 100 lb)			
Aliquippa,Pa. J5	6.975	....	....
Niles,O. R2	6.975	7.175	7.375

TINPLATE, American	1.25 lb	1.50 lb
Aliquippa,Pa. J5	$9.60	$9.85
Dravosburg,Pa. U5	9.60	9.85
Fairfield,Ala. T2,	9.70	9.95
Fairless,Pa. U5,	9.70	9.95
Fontana,Calif. K1	10.35	10.60
Gary,Ind. U5	9.60	9.85
Ind.Har. I-2, Y1,	9.60	9.85
Pitts.,Calif. C11,	10.35	10.60
Sp.Pt.,Md. B2	9.70	9.95
Weirton,W.Va. W6	9.60	9.85
Yorkville,O. W10,	9.60	9.85

BLACK PLATE (Base Box)

Aliquippa,Pa. J5	$7.40
Dravosburg,Pa. U5	7.40
Fairfield,Ala. T2	7.50
Fairless,Pa. U5	7.50
Fontana,Calif. K1	8.15
Gary,Ind. U5	7.40
GraniteCity,Ill. G4	7.50
Ind.Harbor,Ind. I-2, Y1	7.40
Niles,O. R2	7.40
Pittsburg,Calif. C11	8.15
SparrowsPoint,Md. B2	7.50
Warren,O. R2	7.40
Weirton,W.Va. W6	7.40
Yorkville,O. W10	7.40

HOLLOWARE ENAMELING Black Plate (29 Gage)

Dravosburg,Pa. U5	6.65
Gary,Ind. U5	6.65
GraniteCity,Ill. G4	6.75
Ind.Harbor,Ind. Y1	6.65
Yorkville,O. W10	6.65

MANUFACTURING TERNES (Special Coated; Base Box)

Dravosburg,Pa. U5	$9.10
Gary,Ind. U5	9.10
Yorkville,O. W10	9.10

MANUFACTURING TERNES (Light Coated, 6 lb; Base Box)

Yorkville O. W10	$9.55

ROOFING SHORT TERNES (8 lb Coated; Base Box)

Gary,Ind. U5	$10.65

WIRE

WIRE, Manufacturers Bright, Low Carbon

AlabamaCity,Ala. R2	6.60
Aliquippa,Pa. J5	6.60
Alton,Ill. L1	6.775
Atlanta A11	6.80
Bartonville,Ill. K4	6.70
Buffalo W12	6.60
Chicago W13	6.60
Cleveland A7	6.60
Crawfordsville,Ind. M8	6.70
Donora,Pa. A7	6.60
Duluth,Minn. A7	6.60
Fairfield,Ala. T2	6.60
Fostoria,O.(24) S1	6.80
Houston S5	6.85
Jacksonville,Fla. M8	6.95
Johnstown,Pa. B2	6.60
Joliet,Ill. A7	6.60
KansasCity,Mo. S5	6.85
Kokomo,Ind. C16	6.70
LosAngeles B3	7.55
Minnequa,Colo. C10	6.85
Monessen,Pa. P7	6.60
Newark 6-8 ga. I-1	6.90
N.Tonawanda B11	6.60
Palmer,Mass. W12	6.90
Pittsburg Calif. C11	7.55
Portsmouth,O. P12	6.60
Rankin,Pa. A7	6.60
S.Chicago,Ill. R2	6.60
S.SanFrancisco C10	7.55
SparrowsPoint,Md. B2	6.70
Sterling,Ill.(1) N15	6.60
Sterling,Ill. N15	6.70
Struthers,O. Y1	6.60
Waukegan,Ill. A7	6.60
Worcester,Mass. A7	6.90

WIRE, MB Spring, High Carbon

Aliquippa,Pa. J5	7.90
Alton,Ill. L1	8.075
Bartonville,Ill. K4	8.00
Buffalo W12	7.90
Cleveland A7	7.90
Donora,Pa. A7	7.90
Duluth,Minn. A7	7.90
Fostoria,O. S1	7.95
Johnstown,Pa. B2	7.90
LosAngeles B3	8.85
Milbury,Mass.(12) N6	8.20
Minnequa,Colo. C10	8.15
Monessen,Pa. P7, P16	7.90
Muncie Ind. I-7	8.10
Palmer,Mass. W12	8.20
Pittsburg,Calif. C11	8.85
Portsmouth,O. P12	7.90
Roebling N.J. R5	8.20
S.Chicago,Ill. R2	7.90
S.SanFrancisco C10	8.85
SparrowsPt., Md. B2	8.00
Struthers,O. Y1	7.90
Trenton,N.J. A7	8.20
Waukegan,Ill. A7	7.90
Worcester A7,J4,T6,W12	8.20

WIRE, Upholstery Spring

Aliquippa,Pa. J5	7.60
Alton,Ill. L1	7.775
Buffalo W12	7.60
Cleveland A7	7.60
Donora,Pa. A7	7.60
Duluth,Minn. A7	7.60
Johnstown,Pa. B2	7.60
KansasCity,Mo. S5	7.85
LosAngeles B3	8.55
Minnequa,Colo. C10	7.775
Monessen Pa. P7, P16	7.60
NewHaven Conn. A7	7.90
Palmer,Mass. W12	7.90
Pittsburg,Calif. C11	8.55
Portsmouth,O. P12	7.60
Roebling,N.J. R5	7.90
S.Chicago,Ill. R2	7.60
S.SanFrancisco C10	8.55
SparrowsPoint,Md. B2	7.70
Struthers,O. Y1	7.60
Trenton,N.J. A7	7.90
Waukegan,Ill. A7	7.60
Worcester,Mass. A7	7.90

WIRE, Fine & Weaving (8" Coils)

Alton,Ill. L1	12.725
Bartonville,Ill. K4	12.65
Buffalo W12	12.55
Chicago W13	12.55
Cleveland A7	12.55
Crawfordsville,Ind. M8	12.65
Fostoria,O. S1	12.55
Jacksonville,Fla. M8	12.90
Johnstown,Pa. B2	12.55
Kokomo,Ind. C16	12.55
Minnequa,Colo. C10	12.39
Monessen,Pa. P6	12.55
Muncie,Ind. I-7	12.75
Palmer,Mass. W12	12.85
Roebling,N.J. R5	12.85
S.SanFrancisco C10	12.90
Waukegan,Ill. A7	12.55
Worcester,Mass. A7,T6	12.85

WIRE, Gal'd ACSR for Cores

Bartonville,Ill. K4	10.70
Buffalo W12	10.70
Johnstown,Pa. B2	10.70
Minnequa,Colo. C10	10.825
Monessen,Pa. P16	10.70
Muncie,Ind. I-7	10.90
Palmer,Mass. W12	11.00
Pittsburg,Calif. C11	11.50
Portsmouth,O. P12	10.70
Roebling,N.J. R5	11.00
SparrowsPt.,Md. B2	10.80
Struthers,O. Y1	10.70

ROPE WIRE (A)

Bartonville Ill. K4	10.55
Buffalo W12	10.55
Fostoria,O. S1	10.55
Johnstown Pa. B2	10.55
Monessen,Pa. P7, P16	10.55
Muncie,Ind. I-7	10.75
Palmer,Mass. W12	10.85
Portsmouth,O. P12	10.55
Roebling,N.J. R5	10.55
SparrowsPt. B2	10.65
Struthers,O. Y1	10.55
Worcester,Mass. J4	10.85

A: Plow and Mild Plow; add 0.25c for Improved Plow.

WIRE
(Continued)

WIRE, Tire Bead
Bartonville Ill. K4 ....14.15
Monessen Pa. P16 ....14.20
Roebling,N.J. R5 ....14.35

WIRE, Cold-Rolled Flat
Anderson Ind. G6 ....9.50
Baltimore T6 ....9.80
Boston T6 ....9.80
Buffalo W12 ....9.50
Cleveland A7 ....9.50
Crawfordsville,Ind. MS..9.50
Dover,O. G6 ....9.50
Fostoria,O. S1 ....9.50
FranklinPark,Ill. T6 ...9.60
Kokomo,Ind. C16 ....9.50
Massillon O. R8 ....9.80
Milwaukee C23 ....9.70
Monessen,Pa. P7, P16..9.50
Pawtucket,R.I. N8 ....9.80
Riverdale,Ill. A1 ....9.60
Rome N.Y. R6 ....9.50
Trenton,N.J. R5 ....9.80
Worcester A7, T6, W12 9.80

NAIL, Stock
To Dealers & Mfrs. (7) Col.
AlabamaCity,Ala. R2 ...152
Aliquippa Pa. J5 152
Atlanta A11 154
Bartonville,Ill. K4 154
Chicago,Ill. W13 152
Cleveland A9 157
Crawfordsville Ind. M8 ..154
Donora Pa. A7 152
Duluth,Minn. A7 152
Fairfield Ala. T2 152
Galveston,Tex. D7 157
Houston,Tex. S5 157
Jack'ville,Fla.(20) M8 ..163
Johnstown,Pa. B2 152
Joliet,Ill. A7 152
KansasCity,Mo. S5 157
Kokomo,Ind. C16 154
Minnequa,Colo. C10 157
Monessen,Pa. P7 152
Pittsburg,Calif. C11 171
Rankin Pa. A7 152
S.Chicago,Ill. R2 152
SparrowsPt.,Md. B2 154
Sterling,Ill.(1) N15 152
Worcester,Mass. A7 158

NAILS, Cut (100 lb keg)
To Dealers (33)
Conshohocken Pa. A3 ..$9.05
Wheeling,W.Va. W10 ...9.05

STAPLES, Polished Stock
To Dealers & Mfrs. (7) Col.
AlabamaCity,Ala. R2 ...152
Aliqu'ppa Pa. J5 152
Atlanta A11 154
Bartonville Ill. K4 154
Crawfordsville,Ind. M8 ..154
Donora Pa. A7 152
Duluth,Minn. A7 152
Fairfield,Ala. T2 152
Jack'ville,Fla.(20) M8 ..163
Johnstown,Pa. B2 152
Joliet,Ill. A7 152
Kokomo,Ind. C16 154
Minnequa,Colo. C10 157
Monessen,Pa. P7 152
Pittsburg,Calif. C11 171
Rankin,Pa. A7 152
S.Chicago,Ill. R2 152
SparrowsPt.,Md. B2 154
Sterling,Ill.(1) N15 152
Worcester,Mass. A7 158

TIE WIRE, Automatic Baler (14½ Ga.)(Per 97 lb Net Box)
Coil No. 3150
AlabamaCity,Ala. R2 ..$9.45
Bartonville Ill. K4 ....9.45
Buffalo W12 ....9.45
Crawfordsville,Ind. M8..9.55
Donora,Pa. A7 ....9.45
Duluth Minn. A7 ....9.45
Jacksonville Fla. M8 ..10.01
Johnstown,Pa. B2 ....9.45
Joliet Ill. A7 ....9.45
Kokomo,Ind. C16 ....9.55
LosAngeles B3 ....10.24
Minnequa,Colo. C10 ....9.60
Pittsburg,Calif. C11 ...10.23
S.Chicago,Ill. R2 ....9.45
SparrowsPt.,Md. B2 ...9.55
Sterling,Ill. N15 ....9.35

Coil No. 6500 Stand.
AlabamaCity,Ala. R2 ..$9.75
Bartonville,Ill. K4 ....9.75
Buffalo W12 ....9.75
Crawfordsville,Ind. M8..9.85
Donora,Pa. A7 ....9.75
Duluth,Minn. A7 ....9.75
Jacksonville Fla. M8 ...10.31
Johnstown,Pa. B2 ....9.75
Joliet,Ill. A7 ....9.75
Kokomo,Ind. C16 ....9.85
LosAngeles B3 ....10.55
Minnequa,Colo. C10 ....9.90
Pittsburg,Calif. C11 ...10.55
S.Chicago,Ill. R2 ....9.75
SparrowsPt.,Md. B2 ...9.85
Sterling,Ill. N15 ....9.65

Coil No. 6500 Interim
AlabamaCity,Ala. R2 ..$9.80
Bartonville,Ill. K4 ....9.80
Buffalo W12 ....9.80
Crawfordsville,Ind. M8..9.90
Donora,Pa. A7 ....9.80
Duluth,Minn. A7 ....9.80
Jacksonville,Fla. M8 ..10.36
Johnstown,Pa. B2 ....9.80
Joliet,Ill. A7 ....9.80
Kokomo,Ind. C16 ....9.90
LosAngeles B3 ....10.60
Minnequa,Colo. C10 ....9.95
Pittsburg,Calif. C11 ...10.60
S.Chicago,Ill. R2 ....9.80
SparrowsPt.,Md. B2 ....9.90
Sterling,Ill. N15 ....9.70

WIRE, Barbed **Col.**
AlabamaCity,Ala. R2..175**
Aliquippa,Pa. J5 ....172†
Atlanta A11 181
Bartonville,Ill. K4 181
Crawfordsville,Ind. M8 ..181
Donora,Pa. A7 ....175†
Duluth,Minn. A7 ....175†
Fairfield Ala. T2 ....175†
Houston Tex. S5 ....180**
Jacksonville,Fla. M8 186
Johnstown Pa. B2 ....179*
Joliet,Ill. A7 ....175†
KansasCity,Mo. S5 ....180**
Kokomo,Ind. C16 ....177†
Minnequa,Colo. C10 ...180**
Monessen,Pa. P7 ....178††
Pittsburg Calif. C11 ...195†
Rankin,Pa. A7 ....175†
S.Chicago,Ill. R2 ....175**
S.SanFrancisco C10 ...195**
SparrowsPoint,Md. B2 ..181*
Sterling Ill (1) N15 ...179††

WOVEN FENCE, 9-15 Ga. **Col.**
Ala City,Ala. R2 ....162**
Aliq'ppa,Pa.9-14½ga J5..165†
Atlanta A11 168
Bartonville,Ill. K4 168
Crawfordsville,Ind. M8 ..168
Donora,Pa. A7 ....162†
Duluth,Minn. A7 ....162†
Fairfield Ala. T2 ....162†
Houston Tex. S5 ....167**
Jacksonville Fla. M8 173
Johnstown,Pa.(43) B2...166
Joliet Ill. A7 ....162†
KansasCity,Mo. S5 ....167**
Kokomo,Ind. C16 ....164†
Minnequa,Colo. C10 ...167**
Monessen,Pa. 9 ga. P7..166††
Pittsburg,Calif. C11 ...185†
Rankin,Pa. A7 ....162†
S.Chicago,Ill. R2 ....162**
Sterling,Ill.(1) N15 ...166††

WIRE (16 Gage)	An'ld Stone	Galv Stone
Ala.City R2	14.50	16.05**
Bartonville K4	14.50	16.55
Buffalo W12	14.50	....
Cleveland A7	14.50	....
Craw'dsville M8	14.60	16.55
Fostoria,O. S1	14.60	16.15†
Jacksonville M8	14.85	16.80
Johnstown B2	14.50	16.40*
Kokomo C16	14.60	16.15†
Minnequa C10	14.75	16.45**
Palmer,MassW12	14.50	16.05*
Pitts.Calif. C11	14.85	16.40†
S.Chicago R2	14.50	16.05**
SparrowsPt. B2	14.60	16.50*
Sterling(1) N15	14.50	16.45††
Waukegan A7	14.50	16.05
Worcester A7	14.80	....

WIRE, Merchant Quality

(6 to 8 gage)	An'ld	Galv.
Ala.City,Ala. R2	7.50	7.90**
Aliquippa J5	7.40	7.925†
Atlanta A11	7.60	8.20
Bartonville(4&8) K4	7.60	8.20
Buffalo W12	7.50	7.90†
Cleveland A7	7.50	....
Crawfordsville M8	7.60	8.20
Donora,Pa. A7	7.50	7.90†
Duluth,Minn. A7	7.50	7.90†
Fairfield T2	7.50	7.90†
Houston(4&8) S5	7.65	8.00**
Jack'ville,Fla. M8	7.85	8.45
Johnstown B2(4&8)	7.50	8.10*
Joliet,Ill. A7	7.50	7.90†
Kana.City(4&8) S5	7.65	8.05**
Kokomo C16	7.60	8.00†
LosAngeles B3	8.45	9.05*
Minnequa C10	7.65	8.05**
Monessen P7(4&8)	7.40	8.00*†
Palmer,Mass. W12	7.80	8.20†
Pitts. Calif. C11	8.45	8.85†
Portsmouth,O. P12	7.50	....
Rankin A7	7.50	7.90**
S.Chicago R2	7.50	7.90**
S.SanFran. C10	8.35	8.75**
Spar'wsPt. B2(4&8)	7.60	8.20*
Str'ling(1)(4&8)N15	7.40	8.00*†
Struth'rs,O.(4&8) Y1	7.50	8.00†
Worcester,Mass.A7	7.80	8.20†

Based on zinc price of: *13.50c. †5c. ‡10c. ††Less than 10c. †††3c. **Subject to zinc equalization extras.

BALE TIES, Single Loop **Col.**
AlabamaCity,Ala. R2 ...175
Atlanta A11 178
Bartonville,Ill. K4 177
Crawfordsville,Ind. M8 ..177
Donora,Pa. A7 175
Duluth,Minn. A7 175
Fairfield,Ala. T2 175
Jacksonville,Fla. M8 182
Joliet,Ill. A7 175
Houston S5 178
KansasCity,Mo. S5 178
Kokomo,Ind. C16 177
Minnequa,Colo. C10 178
Pitts.Calif. C11 199
S.Chicago R2 175
S.SanFran.,Calif. C10 ..197
SparrowsPoint,Md. B2 ..177
Sterling,Ill.(1) N15 173

FENCE POSTS **Col.**
ChicagoHts.,Ill. C2, I-2..157
Duluth,Minn. A7 157
Franklin,Pa. F5 157
Huntington,W.Va. W7..157
Johnstown,Pa. B2 157
Marion,O. P11 157
Minnequa,Colo. C10 162
Moline,Ill. R2 162
S.Chicago,Ill. R2 157
Tonawanda,N.Y. B12 157
Williamsport,Pa. S10 160

FASTENERS

(Base discounts, full case quantity, per cent off list to consumer, f.o.b. mill)

Carriage, Machine Bolts
Full-Size Body (cut thread)
†½" x 6" and smaller 61
Larger than ½" diam. and all diams. longer than 6" 55
Under-Size Body (rolled thread; not nutted):
¼" x 6" and smaller. 61

†½" x 4" and smaller and shorter are not nutted.

Carriage, Machine & Lag Bolts, Hot Galvanized:
½" and smaller 42
Larger than ½" diam. and all diams. longer than 6" 32

Lag Bolts
All diams. & 6" and shorter 61
All diams. longer than 6" 55

Plow, Tap & Blank Bolts
½" x 6" and smaller. 61
Larger than ½" diam. and all diams. longer than 6" 55

Ribbed Neck, Carriage, Step, Elevator, Fitting-up and Tire Bolts:
All sizes 61

STOVE BOLTS, SLOTTED
(nuts not attached; bulk)
¼" to ¼" diam. incl., 3" or shorter; 61
25,000 to 199,999 pieces 61
200,000 or more pieces 64
⅜" to ½" diam., incl., 3" or shorter:
15,000 to 99,999 pieces 61
100,000 or more pieces 64
Longer than 3", any diam.: 61
5000 to 99,999 pieces.
100,000 or more pieces 64

RIVETS

F.o.b. Cleveland and/or freight equalized with Pittsburgh, f.o.b. Chicago, and/or freight equalized with Birmingham except where equalization is too great.
Structural ½-in., larger 9.95
⅞-in. under. List less 32%

BOILER TUBES

Net base c.l. prices, dollars per 100 ft, mill; minimum wall thickness, cut lengths 16 to 24 ft, inclusive.

O.D. In.	B.W. Gage	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.
1	13	....	21.55	20.90
1¼	13	....	25.53	21.25
1½	13	24.24	28.22	23.50
1¾	13	28.63	33.34	27.76
2	13	32.09	37.37	31.13
2¼	13	36.14	42.09	35.05
2½	12	39.23	45.67	38.05
2¾	12	43.22	50.31	41.91
2¾	12	46.79	54.48	45.38
3	12	49.90	58.10	48.39

RAILWAY MATERIALS

	Standard No. 1	Standard No. 2	Tee Rails All No. 2	Tee Rails 60 lb Under
RAILS				
Bessemer,Pa. U5	4.725	4.625	4.675	5.65
Ensley,Ala. T2	4.725	4.625	....	5.65
Fairfield,Ala. T2	....	....	....	5.65
Gary,Ind. U5	4.725	4.625	4.675	....
Huntington,W.Va. W7	....	....	....	5.65
IndianaHarbor Ind. I-2	4.725	4.625	4.675	....
Johnstown,Pa. B2	....	....	....(16)5.65	
Lackawanna,N.Y. B2	4.725	4.625	....(16)5.65	
Minnequa,Colo. C10	4.725	4.625	....	6.15
Steelton,Pa. B2	4.725	4.625	....	....
Williamsport,Pa. S10	....	....	....	5.65

TIE PLATES
Fairfield,Ala. T2 ..5.625
Gary,Ind. U5 ..5.625
Ind.Harbor,Ind. I-2 ...5.625
Lackawanna,N.Y. B2 ..5.625
Minnequa,Colo. C10 ...5.625
Seattle B3 ..5.775
Steelton,Pa. B2 ..5.625
Torrance,Calif. C11 ...5.775

TRACK BOLTS, Untreated
Cleveland R2 ..12.15
KansasCity,Mo. S5 ...12.90*
Lebanon,Pa. B2 ..12.15
Minnequa,Colo. C10 ...12.15
Pittsburgh O3, P14 ...12.15
Seattle B3 ..12.65

*Treated

AXLES
Ind.Harbor,Ind. S13 ..7.80
Johnstown,Pa. B2 .. 7.50

JOINT BARS
Bessemer,Pa. U5 ..5.825
Fairfield,Ala. T2 ..5.825
Ind Harbor,Ind. I-2 ...5.825
Joliet Ill. U5 ..5.825
Lackawanna,N.Y. B2 ..5.825
Minnequa,Colo. C10 ...5.825
Steelton Pa. B2..5.825

SCREW SPIKES
Cleveland R2 ..11.90
Pittsburgh O3 ..11.90

STANDARD TRACK SPIKES
Fairfield,Ala. T2 ..8.05
Ind.Harbor,Ind. Y1 ...8.05
Ind Harbor,Ind. I-2 ...7.90
KansasCity,Mo S5 ...7.90
Lebanon,Pa. B2 ..8.05
Minnequa,Colo. C10 ...7.90
Pittsburgh J5 ..8.05
Seattle B3 ..8.55
S.Chicago,Ill. R2 ..8.05
Struthers,O. Y1 ..8.05
Youngstown R2 ..8.05

METAL POWDER

(Per pound f.o.b. shipping point in ton lots for minus 100 mesh, except as noted)
Sponge iron: Cents
Swedish, c.l.f., Camden, N.J., c.l. in bags 8.50
Domestic:
F.o.b. Johnstown, Pa., Niagara Falls, N.Y., in bags.... 9.50
F.o.b. Riverton, N.J., in bags.... 8.50
Canadian, f.o.b. shipping point 9.50
Electrolytic iron:
Melting stock, 99.9% Fe, irregular fragments of ¼ in. x 1.3 in. 22.00
Annealed, 99.5% Fe 36.50
Unannealed (99+% Fe) 34.00
Unannealed (99+% Fe) (minus 325 mesh) 57.00
Powder Flakes (minus 16, plus 100 mesh).. 31.00
Carbonyl iron:
98.1-99.9%, 3 to 20 microns, depending on grade, 86.00-275.00, in standard 200-lb containers; all minus 200 mesh.
Aluminum:
Atomized, 500 lb. drum frght. allowed
Carlots 16.00
Ton lots 15.00

Antimony, 500 lb lots 32.00*
Brass, 5000-lb lots ..... 41.75-65.25†
Bronze, 5000-lb lots ..... 67.50-71.75†
Copper:
Electrolytic 14.25*
Reduced 14.25*
Lead 7.50*
Manganese:
Minus 35 mesh 64.00
Minus 100 mesh 70.00
Minus 200 mesh 75.00
Nickel, unannealed $1.00
Nickel-Silver, 5000-lb lots ..... 62.75-65.25†
Phosphor-Copper, 5000-lb lots 68.75
Silicon 47.50
Solder 7.00*
Stainless Steel, 302 .. 99.00
Stainless Steel, 316 .. $1.32
Tin 14.50*
Zinc 5000-lb lots 19.25-33.00†
Tungsten Dollars
Melting grade, 99% 60 to 200 mesh:
1000 lb and over.... 4.50
Less than 1000 lb.... 4.65
Chromium, electrolytic 99.8% Cr min. metallic basis 5.00

*Plus cost of metal. †Depending on composition. ‡Depending on mesh. §70% Cu, 29% Zn, 1% Ni. **64% Cu, 18% Zn, 18% Ni.

Footnotes

(1) Chicago base.
(2) Angles, flats, bands.
(3) Merchant.
(4) Reinforcing.
(5) 1½-in. to less than 1 7/16-in.
(6) Chicago or Birm. base.
(7) To jobbers, 3 cols. lower.
(8) 16 Ga. and heavier.
(9) Merchant quality; add 0.35c for special quality.
(10) Pittsburgh base.
(11) Cleveland & Pitts. base.
(12) Worcester, Mass., base.
(13) Add 0.25c for 17 Ga. & heavier.
(14) Gage 0.143 to 0.249 in.; for gage 0.142 and lighter, 5.80c.
(15) ⅝" and thinner.
(16) 40 lb and under.
(17) Flats only; 0.25 in. & heavier.
(18) To dealers.
(19) Chicago & Pitts. base.
(20) Plus 1c per 100 lb.
(21) New Haven, Conn., base.
(22) Dehd. San Francisco Bay area.
(24) Deduct 0.10c, finer than 15 Ga.
(25) Bar mill bands.
(26) Delivered in mill zone, 5.25c.
(27) Bar mill sizes.
(28) Bonderized.
(29) Youngstown base.
(30) Sheared; for universal mill add 0.45c.
(31) Widths over ⅝ in.; 6.90c for widths ⅝ in. and under by 0.125 in. and thinner.
(32) Buffalo base.
(33) To jobbers, deduct 20c.
(34) 9.60c for cut lengths.
(35) 12" and narrower.
(36) 54" and narrower.
(37) 13 Ga. & heavier; 60" & narrower.
(38) 14 Ga. & Lighter; 48" & narrower.
(39) 48" and narrower.
(40) Lighter than 0.035"; 0.035" and heavier, 0.25c higher.
(41) 9.10c for cut lengths.
(42) Mill lengths, f.o.b. mill; deld. in mill zone or within switching limits, 5.25c.
(43) 9-14½ Ga.
(48) 6-7 Ga.
(49) 3½-in. and smaller rounds; 7.35c over 3½-in. and other shapes.

SEAMLESS STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	2		2½		3		3½		4		5		6	
List Per Ft	37c		58.5c		76.5c		92c		$1.09		$1.48		$1.92	
Pounds Per Ft	3.68		5.82		7.62		9.20		10.89		14.81		19.18	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	4	+14	10.5	+8.25	13	+5.75	14.5	+4.25	14.5	+4.25	14	+4.75	16.5	+2.25
Ambridge, Pa. N2	4	....	10.5	....	13	....	14.5	....	14.5	....	14	....	16.5	....
Lorain, O. N3	4	+14	10.5	+8.25	13	+5.75	14.5	+4.25	14.5	+4.25	14	+4.75	16.5	+2.25
Youngstown Y1	6.5	+11.5	10.5	+8.25	13	+5.75	14.5	+4.25	14.5	+4.25	14	+4.75	16.5	+2.25

ELECTRIC WELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Youngstown R2	6.5	+11.5	10.5	+8.25	13	+5.75	14.5	+4.25	14.5	+4.25	14	+4.75	16.5	+2.25

BUTTWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	⅛		¼		⅜		½		¾		1		1¼	
List Per Ft	5.5c		6c		6c		8.5c		11.5c		17c		23c	
Pounds Per Ft	0.24		0.42		0.57		0.85		1.13		1.68		2.28	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	....	....	....	....	....	....	18.5	+0.75	21.5	3.25	24	6.75	26.5	8.5
Alton, Ill. L1	....	....	....	....	....	....	16.5	+2.75	19.5	1.25	22	4.75	24.5	6.5
Benwood, W. Va. W10	17.5	+13	9	+16.5	+0.75	+28.5	18.5	+0.75	21.5	3.25	24	6.75	26.5	8.5
Butler, Pa. F6	18	+12.5	9.5	+18	1.5	+26	....	....	....	....	....	....	....	....
Etna, Pa. N2	....	....	....	....	....	....	18.5	+0.75	21.5	3.25	24	6.75	26.5	8.5
Fairless, Pa. N3	....	....	....	....	....	....	16.5	+2.75	19.5	1.25	22	4.75	24.5	6.5
Fontana, Calif. K1	....	....	....	....	....	....	6	+13.25	9	+9.25	11.5	+5.75	14	+4
Ind. Harbor, Ind. Y1	....	....	....	....	....	....	17.5	+1.75	20.5	2.25	23	5.75	25.5	7.5
Lorain, O. N3	....	....	....	....	....	....	18.5	+0.75	21.5	3.25	24	6.75	26.5	8.5
Sharon, Pa. S4	18	+12.5	9.5	+18	1.5	+26	....	....	....	....	....	....	....	....
Sharon, Pa. M8	....	....	....	....	....	....	18.5	+0.75	21.5	3.25	24	6.75	26.5	8.5
Sparrows Pt., Md. B2	16	+12.5	7.5	+18	+0.5	+25	16.5	+0.75	19.5	3.25	22	6.75	24.5	8
Youngstown R2, Y1	....	....	....	....	....	....	18.5	+0.75	21.5	3.25	24	6.75	26.5	8.5
Wheatland, Pa. W9	18	+12.5	9.5	+18	1.5	+26	18.5	+0.75	21.5	3.25	24	6.75	26.5	8.5

Size—Inches	1½		2		2½		3		3½		4	
List Per Ft	27.5c		37c		58.5c		76.5c		92c		$1.09	
Pounds Per Ft	2.73		3.68		5.82		7.62		9.20		10.89	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	27	9.5	27.5	10	29	10.75	29	10.75	....	....	....	....
Alton, Ill. L1	25	7.5	25.5	8	27	8.75	27	8.75	....	....	....	....
Benwood, W. Va. W10	27	9.5	27.5	10	29	10.75	29	10.75	19.5	0.75	19.5	0.75
Etna, Pa. N2	27	9.5	27.5	10	29	10.75	29	10.75	19.5	0.75	19.5	0.75
Fairless, Pa. N3	25	7.5	25.5	8	27	8.75	27	8.75	17.5	+1.25	17.5	+1.25
Fontana, Calif. K1	14.5	+3	15	+2.5	16.5	+1.75	16.5	+1.75	7	+11.75	7	+11.75
Ind. Harbor, Ind. Y1	26	8.5	26.5	9	28	9.75	28	9.75	18.5	+0.25	18.5	+0.25
Lorain, O. N3	27	9.5	27.5	10	29	10.75	29	10.75	....	....	....	....
Sharon, Pa. M6	27	9.5	27.5	10	29	10.75	29	10.75	....	....	....	....
Sparrows Pt., Md. B2	25	9	25.5	9.5	27	9.75	27	9.75	17.5	+0.25	17.5	+0.25
Wheatland, Pa. W9	27	9.5	27.5	10	29	10.75	29	10.75	19.5	0.75	19.5	0.75
Youngstown R2, Y1	27	9.5	27.5	10	29	10.75	29	10.75	19.5	0.75	19.5	0.75

*Galvanized pipe discounts based on current price of zinc (13.50c, East St. Louis).

Stainless Steel

Representative prices, cents per pound; subject to current lists of extras

AISI Type	Rerolling Ingot	Rerolling Slabs	Forging Billets	Seamless Tube	H.R. Strip	Wire Rods; C.F. Wire	Bars; Structural Shapes	Plates	Sheets	C.R. Strip; Flat Wire
201	18.50	23.00	....	....	31.00	....	....	....	42.25	39.00
202	19.75	25.50	31.00	36.25	33.50	....	36.75	38.75	42.50	42.50
301	19.25	23.75	....	36.75	32.00	36.00	38.00	....	44.25	41.00
302	20.50	26.25	32.00	37.25	34.50	36.25	38.25	40.25	44.50	44.50
302B	20.25	26.50	33.00	37.25	37.75	36.25	38.25	40.25	47.00	47.00
303	....	26.75	34.75	40.00	....	39.00	41.00	....	....	....
304	21.75	27.50	33.75	39.00	37.25	38.25	40.25	43.00	47.25	47.25
304L	....	....	40.25	....	43.75	45.25	47.25	50.00	54.25	54.25
305	23.25	30.50	....	39.50	40.25	38.25	40.25	43.50	50.25	50.25
308	25.00	32.00	40.00	....	42.75	45.25	47.50	51.75	54.00	54.00
309	32.50	41.25	48.25	....	55.00	54.00	56.75	60.25	69.00	69.00
310	39.75	50.50	64.75	....	71.00	72.25	76.50	78.25	81.75	81.75
314	....	....	....	....	....	72.75	....	78.25	....	....
316	33.00	41.75	52.75	....	59.75	59.75	62.75	66.00	70.25	70.25
316L	....	....	58.75	....	65.75	66.75	69.75	73.00	77.25	77.25
317	48.25	51.25	55.75	....	76.50	74.75	78.50	81.00	87.75	87.75
321	26.50	33.50	39.75	....	45.75	45.00	47.25	51.25	56.25	56.25
18-8CbTa	30.75	39.50	47.25	....	54.75	53.75	55.50	60.00	68.50	68.50
403	....	....	28.75	32.75	....	32.25	34.00	36.25	....	....
405	17.50	23.00	26.75	31.00	32.25	30.50	32.00	33.75	42.25	42.25
410	15.00	19.50	25.50	29.50	28.00	29.00	30.50	31.75	36.25	36.25
416	....	....	26.00	30.00	....	29.50	31.00	....	....	....
420	....	30.25	31.00	36.00	37.75	35.50	37.25	40.75	56.00	56.00
430	15.25	19.75	26.00	30.00	28.75	29.50	31.00	32.25	36.75	36.75
430F	....	....	26.50	30.50	....	30.00	31.50	....	....	....
431	....	25.50	33.25	....	....	37.25	39.25	40.75	....	....
446	....	....	35.50	40.50	53.25	40.00	42.00	43.25	63.25	63.25

Stainless Steel Producers Are: Allegheny Ludlum Steel Corp.; Alloy Metal Wire Co. Inc.; Alloy Tube Div., Carpenter Steel Co.; American Steel & Wire Div., U. S. Steel Corp.; Armco Steel Corp.; Babcock & Wilcox Co.; Bethlehem Steel Co.; J. Bishop & Co.; G. O. Carlson Inc.; Carpenter Steel Co.; Charter Wire Products Co.; Cold Metal Products Co.; Crucible Steel Co. of America; Damascus Tube Co.; Wilbur B. Driver Co.; Driver-Harris Co.; Eastern Stainless Steel Corp.; Elwood Ivins Steel Tube Works Inc.; Firth Sterling Inc.; Ft. Wayne Metals Inc.; Globe Steel Tubes Co.; Helical Tube Co.; Indiana Steel & Wire Co.; Ingersoll Steel Div., Borg-Warner Corp.; Jessop Steel Co.; Johnson Steel & Wire Co. Inc.; Joslyn Mfg. & Supply Co.; Kenmore Metals Corp.; Maryland Fine & Specialty Wire Co.; McLouth Steel Corp.; Metal Forming Corp.; McInnes Steel Co.; National-Standard Co.; National Tube Div., U. S. Steel Corp.; Newman-Crosby Steel Co.; Pacific Tube Co.; Page Steel & Tube Div., American Chain & Cable Co. Inc.; Pittsburgh Rolling Mills Inc.; Republic Steel Corp.; Rodney Metals Inc.; Rome Mfg. Co.; Rotary Electric Steel Co.; Sharon Steel Corp.; Sawhill Tubular Products Inc.; Simonds Saw & Steel Co.; Specialty Wire Co. Inc.; Spencer Wire Corp.; Stainless Welded Products Inc.; Standard Tube Co.; Superior Steel Corp.; Superior Tube Co.; Timken Roller Bearing Co.; Trent Tube Co.; Tube Methods Inc.; Ulbrich Stainless Steels; United States Steel Corp.; Universal-Cyclops Steel Co.; Wallingford Steel Co.; Washington Steel Corp.

Clad Steel

	Plates, Carbon Base 10%	Plates, Carbon Base 20%	Sheets, Carbon Base 20%
302	....	....	30.50
304	31.55	37.95	32.50
304-L	34.10	40.90	....
316	36.50	42.75	47.00
316-L	42.30	50.10	....
316-CB	42.50	50.50	....
321	33.25	39.65	37.25
347	36.20	44.35	48.25
405	26.35	33.85	....
410	28.85	33.35	....
430	28.85	33.35	....
Inconel	50.00	65.95	....
Nickel	41.60	56.15	....
Nickel, Low Carbon	43.80	60.55	....
Monel	44.50	60.50	....
Copper*	....	....	46.00

	Strip, Carbon Base, Cold Rolled 10%	Strip, Carbon Base, Cold Rolled Both Sides
Copper*	33.40	42.15

*Deoxidized. Production points: Stainless-clad sheets, New Castle, Ind. I-4; stainless-clad plates, Claymont, Del. C22, Coatesville, Pa. L7, New Castle, Ind. I-4 and Washington, Pa. J3; nickel, inconel, monel-clad plates, Coatesville L7; copper-clad strip, Carnegie, Pa. S18.

Tool Steel

Grade	$ per lb	Grade	$ per lb
Regular Carbon	0.275	5% Cr Hot Work	0.430-0.460
Extra Carbon	0.330	W-Cr Hot Work	0.450
Special Carbon	0.390	V-Cr Hot Work	0.470
Oil Hardening	0.430	Hi-Carbon-Cr	0.770

Grade by Analysis (%)

W	Cr	V	Co	Mo	$ per lb
20.25	4.25	1.6	12.25	...	4.090
18.25	4.25	1	4.75	...	2.305-2.475
18	4	2	9	...	2.675-2.6775
18	4	2	....	...	1.765
18	4	1	....	...	1.600
13.75	3.75	2	5	...	2.245
13.5	4	3	....	...	1.865
9	3.5	..	....	...	1.180
6	4	2	....	5	1.105
6	4	3	....	6	1.350
1.5	4	1	....	8.5	0.960

Tool steel producers include: A4, A8, B2, B8, C4, C9, C13, C18, D4, F2, J3, M14, S8, U4, V2 and V3.

Pig Iron

F.o.b. furnace prices in dollars per gross ton, as reported to STEEL. Minimum delivered prices are approximate and do not include 3% federal tax.

Birmingham District	Basic	No. 2 Foundry	Malle-able	Besse-mer
AlabamaCity,Ala. R2	54.50	....	....	....
Birmingham R2	54.50	55.00‡	....	....
Birmingham U6	....	55.00‡	59.00	....
Woodward,Ala. W15	54.50	55.00‡	59.00	....
Cincinnati, deld.	....	62.70	....	....
Buffalo District				
Buffalo H1, R2	60.00	60.50	61.00	61.50
Tonawanda,N.Y. W12	60.00	60.50	61.00	61.50
N.Tonawanda,N.Y. T9	....	60.50	61.00	61.50
Boston, deld.	70.65	71.15	71.65	....
Rochester,N.Y., deld.	63.02	63.52	64.02	....
Syracuse,N.Y., deld.	64.12	64.62	65.12	....
Chicago District				
Chicago I-3	60.00	60.50	60.50	61.00
Gary,Ind. U5	60.00	....	60.50	....
S.Chicago R2	60.00	....	60.50	....
S.Chicago,Ill. Y1	60.00	60.50	60.50	61.00
S.Chicago,Ill. U5, W14	60.00	....	60.50	61.00
Milwaukee, deld.	62.30	62.80	62.80	63.30
Muskegon,Mich., deld.	....	67.18	67.18	....
Cleveland District				
Cleveland R2, A7	60.00	60.50	60.50	61.00
Akron,O., deld.	62.75	63.25	63.25	63.75
Mid-Atlantic District				
Bethlehem,Pa. B2	62.00	62.50	63.00	63.50
NewYork, deld.	....	66.51	67.01	....
Newark, deld.	65.20	65.70	66.20	66.70
Birdsboro,Pa. B10	62.00	62.50	63.00	63.50
Chester,Pa. P14	62.00	62.50	63.00	....
Philadelphia, deld.	63.76	64.26	64.76	....
Steelton,Pa. B2	62.00	62.50	63.00	63.50
Swedeland,Pa. A3	62.00	62.50	63.00	63.50
Philadelphia, deld.	63.76	64.26	64.76	65.26
Troy,N.Y. R2	62.00	62.50	63.00	63.50
Pittsburgh District				
NevilleIsland,Pa. P6	60.00	60.50	60.50	61.00
Pittsburgh (N&S sides), Aliquippa, deld.	....	61.95	61.95	62.45
McKeesRocks, deld.	....	61.60	61.60	62.13
Lawrenceville, Homestead, Wilmerding,Monaca, deld.	....	62.26	62.26	62.79
Verona,Trafford, deld.	62.29	62.82	62.82	63.35
Brackenridge, deld.	62.60	63.10	63.10	63.63
Bessemer,Pa. U5	60.00	....	60.50	61.00
Clairton,Rankin,S.Duquesne,Pa. U5	60.00	....	....	....
Midland,Pa. C18	60.00	....	....	....

Youngstown District	Basic	No. 2 Foundry	Malle-able	Besse-mer
Hubbard,O. Y1	....	....	60.50	....
Sharpsville,Pa. S6	60.00	....	60.50	61.00
Youngstown Y1	....	....	60.50	61.00
Mansfield,O., deld.	64.90	....	65.40	65.90
Duluth I-3	60.00	60.50	60.50	61.00
Erie,Pa. I-3	60.00	60.50	60.50	61.00
Everett,Mass. E1	62.00	62.50	63.00	....
Fontana,Calif. K1	67.50	68.00	....	....
Geneva,Utah C11	60.00	60.50	....	....
GraniteCity,Ill. G4	61.90	62.40	62.90	....
Ironton,Utah C11	60.00	60.50	....	....
LoneStar,Texas L6	....	55.00*	....	....
Minnequa,Colo. C10	62.00	62.50	63.00	....
Rockwood,Tenn. T3	....	55.00‡	59.00	....
Toledo,O. I-3	60.00	60.50	60.50	61.00
Cincinnati, deld.	65.76	66.26	....	....

*Phos. 0.51-0.75%; $56. Phos. 0.31-0.50%.
‡Intermediate (Phos. 0.31-0.69%), $56.

PIG IRON DIFFERENTIALS

Silicon: Add 50 cents per ton for each 0.25% Si or percentage thereof over base grade, 1.75-2.25%, except on low phos iron on which base is 1.75-2.00%.

Manganese: Add 50 cents per ton for each 0.50% manganese over 1% or portion thereof.

Nickel: Under 0.05% no extra; 0.50-0.74%, inclusive, add $2 per ton and each additional 0.25%, add $1 per ton.

BLAST FURNACE SILVERY PIG IRON, Gross Ton

(Base 6.00-6.50% silicon; add $1.25 for each 0.5% Si; 75 cents for each 0.50% Mn over 1%)

Jackson,O. G2, J1	69.00
Buffalo H1	70.25

ELECTRIC FURNACE SILVERY IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.5% Si to 18%; $1 for each 0.50% Mn over 1%; $2 per gross ton premium for 0.045% max P)

NiagaraFalls,N.Y. P15	$92.50
Keokuk,Iowa, Open-hearth & Fdry. (freight allowed K2)	97.00
Keokuk, O. H. & Fdry. 12½ lb pigiets, 16% Si, frgt allowed K2	100.00

LOW PHOSPHORUS PIG IRON, Gross Ton

Lyles,Tenn. T3 (Phos. 0.035% max)	$72.50
Rockwood,Tenn. T3 (Phos. 0.035% max)	72.50
Steelton,Pa. B2 (Phos. 0.035% max)	68.00
Philadelphia, deld.	71.55
Troy,N.Y. R2 (Phos. 0.035% max)	68.00
Cleveland A7 (Intermediate) (Phos. 0.036-0.075% max)	65.00
Duluth I-3 (Intermediate) (Phos. 0.036-0.075% max)	65.00
Erie,Pa. I-3 (Intermediate) (Phos. 0.036-0.075% max)	65.00
NevilleIsland,Pa. P6 (Intermediate) (Phos. 0.036-0.075% max)	65.00

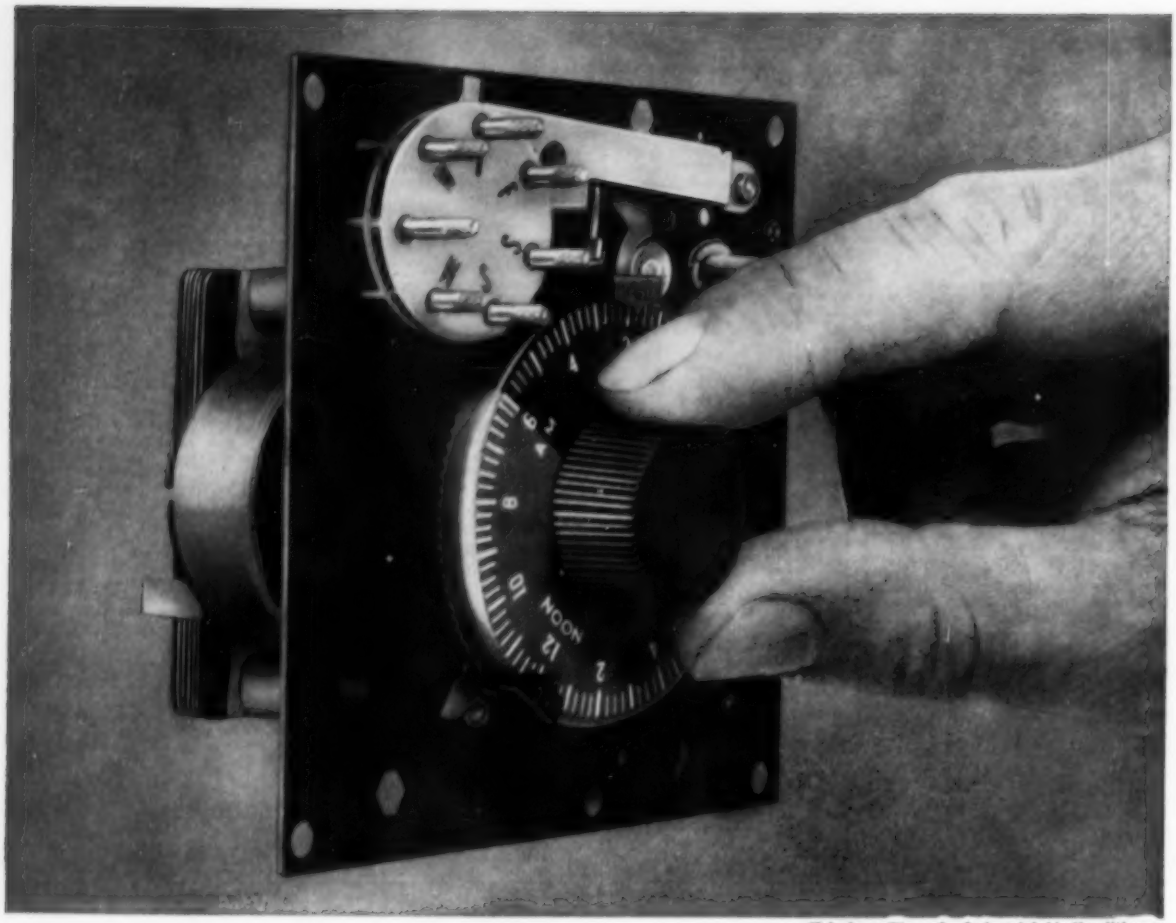
Warehouse Steel Products

Representative prices, per pound, subject to extras, f.o.b. warehouse. City delivery charges are 15 cents per 100 lb except: St. Paul, 25 cents; Moline, Norfolk, Richmond, Washington, 20 cent‡; Baltimore, Boston, Los Angeles, New York, Philadelphia, Portland, San Francisco, Spokane, 10 cents; Atlanta, Houston, Seattle, no charge.

	SHEETS				STRIP	BARS				Standard Structural Shapes	PLATES	
	Hot-Rolled	Cold-Rolled	Gal. 10 Ga.†	Stainless Type 302	Hot-Rolled*	H.R. Mer-chant Qual.	H.R. Spec. Qual.	C.F. Bds.§	H.R. Alloy 4140††		Carbon	Floor
Atlanta	7.14	8.20	8.87	....	7.40	7.42	...	9.39	....	7.63	7.49	9.48
Baltimore	7.24	8.35	8.50	....	7.70	7.70	...	8.49[5]	14.39	7.94	7.56	9.02
Birmingham	7.13	8.24	8.85	....	7.21	7.27	7.80	9.35	....	7.43	7.45	9.50
Boston	8.12	9.07	10.32	53.32	8.21	8.21	8.76	9.86	13.66	8.27	8.41	9.84
Buffalo	7.20	8.25	10.01	....	7.35	7.35	8.05	7.90	13.50	7.60	7.65	9.00
Chattanooga	7.28	8.44	8.60	....	7.36	7.42	7.95	9.18	....	7.63	7.60	9.32
Chicago	7.13	8.24	9.10	46.75	7.21	7.27	7.80	7.75	13.15	7.43	7.45	8.72
Cincinnati	7.25	8.23	9.10	46.10	7.45	7.51	8.04	8.15	13.40	7.90	7.74	8.97
Cleveland	7.13	8.24	8.95	49.16	7.31	7.33	7.86	8.00	13.21	7.76	7.62	8.89
Denver	8.95	10.31	11.73	....	9.10	9.10	...	9.82	17.87	8.95	9.10	10.50
Detroit	7.32	8.43	9.38	43.50	7.49	7.55	8.08	8.04	13.39	7.90	7.73	8.91
Erie, Pa.	7.08	8.24	8.95[10]	....	7.31	7.35	...	8.10[10]	....	7.65	7.30	8.79
Houston	7.85	8.75	10.49	....	8.15	8.25	...	9.85	14.09	8.20	7.80	9.20
Jackson, Miss.	7.46	8.52	9.22	....	7.44	7.59	8.12	9.44	....	7.75	7.77	9.41
Los Angeles	8.15	10.00	11.00	51.50	8.50	8.15	8.70	10.90	14.40	8.30	8.75	10.85
Milwaukee	7.22	8.33	9.19	....	7.30	7.36	7.89	7.94	13.24	7.60	7.54	8.81
Moline, Ill.	7.15	8.44	8.85	....	7.41	7.43	...	8.00	....	7.63	7.34	....
New York	7.78	8.88	9.63	53.13	8.23	8.16	8.71	9.77	13.57	8.11	8.21	9.50
Norfolk, Va.	7.35	....	....	....	7.80	7.85	...	9.95	....	8.10	7.60	9.10
Philadelphia	7.34	8.44	9.41	....	7.99	7.73	8.26	8.52	13.35	7.75	7.72	8.83**
Pittsburgh	7.13	8.24	9.40	49.00	7.31	7.27	7.80	8.00	13.15	7.43	7.45	8.72
Portland, Oreg.	8.30	8.80	10.80	....	8.55	8.25	...	12.55	15.30	8.40	8.20	9.45
Richmond, Va.	7.25	....	9.49	....	7.85	7.85	...	9.50	....	8.10	7.50	9.35
St. Louis	7.42	8.53	9.39	43.89	7.50	7.56	8.09	8.29	13.44	7.83	7.74	9.01
St. Paul	7.46	8.59	9.16	....	7.72	7.74	...	8.51	13.51	7.94	7.65	9.12
San Francisco	8.20	9.65	10.15	51.65	8.35	8.15	8.70	11.45	14.40[9]	8.25	8.30	10.50
Seattle	8.75	10.50	10.90	49.60	8.90	8.60	9.15	12.25	14.75	8.50	8.50	10.70
Spokane, Wash.	8.75	11.10	10.90	....	8.90	8.60	9.15	12.25	15.40	8.50	8.50	11.20
Washington	7.78	9.80	8.60	....	8.49	8.24	...	9.49	....	8.51	8.11	9.56

*Prices do not include gage extras; †prices include gage and coating extras (based on 12.50c zinc at Los Angeles and 13.50c at other points), except in Birmingham (coating extra excluded); ‡includes 35-cent bar quality extras; **⅛-in. and heavier; ††as annealed; §§under ⅜-in.

Base quantities, 2000 to 4999 lb except as noted; Cold-rolled strip and cold-finished bars, 2000 lb and over except in Seattle, 2000 to 9999 lb, and in Los Angeles, 6000 lb and over; stainless sheets, 8000 lb except in Chicago, New York and Boston, 10,000 lb and in San Francisco, 2000 to 4999 lb; hot-rolled products on West Coast, 2000 to 9999 lb; [5]—500 to 9999 lb; [8]—400 to 999 lb; [9]—4000 lb and over; [6]—1000 to 1999 lb; [4]—1000 lb and over; [7]—1500 to 3999 lb; [3]—2000 to 3999 lb; [9]—f.o.b. local delivery in lots of 10,000 lb and over; [10]—2000 lb and over.



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Major Industrial Components

(Per cent of respondents)

Compared with those three months ago, inventories are now:

	HIGHER	LOWER	THE SAME
Castings[1]	20	21	59
Other formed components[2]	14	21	65
Machined components[3]	12	16	72
Fasteners	13	1	86
Electrical equipment & motors	14	8	78
Mechanical rubber goods & belting	7	13	80

[1] Die, gray iron, malleable, nonferrous, steel

[2] Forgings, stampings, spring & wire shapes

[3] Bearings, couplings, cylinders, gears, screw machine products

Buying Trend Shifts

Purchasing agents didn't buy as much as they planned to last quarter. Result: General easing of component supplies. Outlook is for further reductions in stocks

DISAPPOINTED because you didn't build your stocks of major industrial components last quarter?

You can find some comfort in the fact that not many other purchasing agents did either. According to STEEL's latest survey of industrial component inventories, only 14 per cent of the respondents built stocks. Three months ago, 32 per cent said they planned to build during the second quarter (STEEL, Apr. 2, p. 63).

Outlook—Maybe buyers counted on quick and easy settlement of the steel labor issue. Maybe they were preparing for a second half slowdown in general business conditions. Maybe supplies aren't available for stocking. Maybe sales depleted inventories faster than expected.

At any rate, what started out to be an inventory building first half screeched to a halt. Outlook for the third quarter: 21 per cent plan to build.

Cutback—If there's a third quarter slump, there will be little help from buyers stocking up for a fourth quarter rebound. Almost 31 per cent of the respondents plan to lower stocks in the next three months. That's an outgrowth of last quarter's minor trend when 16 per cent were planning to cut stocks.

Where are inventories higher than desired? Says a New Jersey PA: "Bearings, castings, fasteners, forgings and springs . . . due to our efforts to protect customers from rising prices after steel negotiations."

Long Items—Several buyers note high inventories on bearings, malleable castings, forgings, electric motors and stampings. Among STEEL's respondents, comments like these are more common than at any time in the last six months:

Los Angeles: "Both purchasing and inventory policies are improving, companywise."

Philadelphia: "Delivery is generally no factor because most items can be obtained within one to four weeks."

Wisconsin: "In general, materials we use appear to be in much freer supply than they were three months ago."

Tight Supply—Steel castings still top the most wanted lists, but the situation is a little easier there, too. One out of ten buyers thinks they are hard to find, compared with one out of five three months ago. A shortage of one or more types of castings concerns about 20 per cent of the respondents.

Electrical equipment of many types appears to be in shorter supply than last quarter. One out of five buyers can't get all the motors or solenoids he wants.

Easing—Purchasing agents expect, in general, that the third quarter will offer no great difficulties. Only four per cent think their inventory positions will be worse three months from now. About 40 per cent think they will be better off.

The tendency to cut inventories is not noticeable in the far western replies to STEEL's survey. The Midwest seems to be the first region to feel the new trend strongly.

Plates . . .

Plate Prices, Page 104

Tankmakers have practically no plates in stock. They are fairly comfortably fixed with heavy sheets, and where this material can be used, they are not too concerned about operations.

The outlook for improvement in the supply of medium and heavy plates over the remainder of the year is not too promising.

An Ohio sheetmaker has booked orders for 35,000 tons of light plates to be produced in coils on its continuous mill. This producer has been in and out of the plate market for some time, filling gaps in its sheet schedule with plate tonnage.

Another large Ohio mill has been rolling light gage plates when its continuous mill schedule permits, but they are largely for its own use. Indications are plate users will get little relief from the continuous sheet mills unless demand for sheet dries up a lot more than it has.

Only miscellaneous users of light gage narrow plates have been able to bolster inventories in New England, including low alloy tonnage from the strip mills. Small tank shops in the area have been helped, and a few have built up small inventories of finished structures. In doing so, they have put steel into production that otherwise would have gone into stock.

Weldment shops, warehouse plate departments and other buyers of heavy plates, hold small stocks. Conservative booking by plate producers over a long period, spreading available tonnage on the basis of past

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Forms Available?
Sleeves; flat sheets to 40" wide in rolls on 3" cores; folded sheet sealed on one edge.

Formability?
Into containers of practically any style, size, shape.

Ease of Packaging?
Can be cut, wares enclosed, and heat sealed on any standard, high speed, automatic equipment.

Color?
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Strength?
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usage, has eliminated inventory build-ups.

A Pittsburgh firm building heavy industrial equipment, says allocations of plate and structural shapes have been so slim it will be affected adversely within a week if there is a steel strike. Other users will have to curtail in a month at latest.

Shortages of wide-flange beams might force suspension of some projects in the third quarter.

Sheets, Strip . . .

Sheet & Strip Prices, Pages 105 & 106

Consumers are displaying little forward interest in hot-rolled and cold-rolled sheets. Interest in other grades also is lagging. Exceptions are nickel bearing stainless and heavy gage sheets. Heavy gage sheets are in active demand for railroad equipment, construction and light tanks.

Low silicon sheets and enameling stock demand has been lagging for some weeks, although there was a last minute effort in June on the part of some consumers to get in tonnage as a hedge against a strike and higher prices this summer. In both instances, the lag in buying reflected rather good-sized stocks of household appliances at the wholesale and retail levels.

While some large consumers hold substantial stocks of hot and cold sheets in the East, the small and medium sized consumers in the area have little in the way of excess inventories. They only recently got back to about normal. This means the small and medium sized consumer has supplies of six to seven weeks. Galvanized sheet users are comfortably fixed.

Some cold-rolled sheet tonnage is still available for the third quarter at Cleveland. Hot-rolled continues tight. This is explained by the fact some area mills are not actively offering hot-rolled in the open market. Some continuous mills in Ohio are rolling light gage plates to take up gaps in schedules arising from the sluggishness in demand for cold-rolled sheets. Expectations are that the buying of the light, flat-rolled items will pick up along toward the end of the third quarter. A sharp comeback in auto requirements is seen.

In view of lower consumption, notably at stamping shops, sheet and strip inventories in New England are generally sufficient to support production through the summer, at least through August. The decline in area shop operations began ahead of the seasonal letdown in the case of more consumers than usual. Automotive stampers' press operations are irregular, and, in most cases, steel is on hand for the balance of 1956 model runs. Sheet tonnage is still needed for August, but in many cases suppliers are uncertain as to specifications and the amounts needed.

Mill carry-overs vary. Most producers cleared out the bulk of the tonnage promised consumers for delivery by June 30.

A Pittsburgh producer of cold rolled last week said the auto builders are reluctant to reveal their late third quarter requirements. They have enough steel for 30 to 60 days of production at present reduced work schedules, and were not stampeded into buying in June tonnage they will not need until September.

Most sheet consumers can obtain their immediate requirements from warehouses should a strike cut off mill shipments. Distributors' inventories are described as comfortable in the light flat-rolled items. Vacation schedules at manufacturing plants also will ease supply conditions to some extent.

Steel Bars . . .

Bar Prices, Page 104

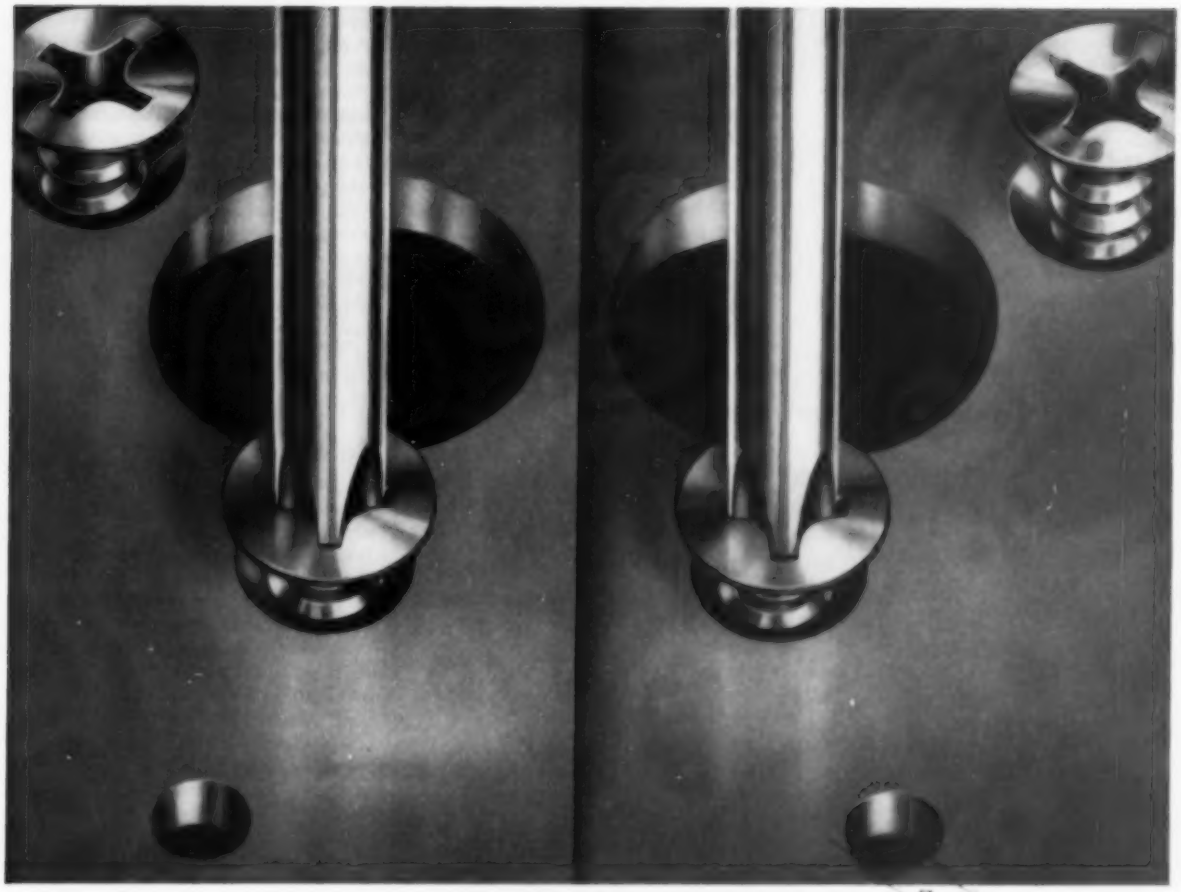
Entering the third quarter, unfilled orders for hot-rolled carbon bars are considered more normal than they have been for some time. Most consummers have been able to build up inventories during recent weeks, the mills seeking to get out as much tonnage as possible before the end of June.

Average inventory of consumers is estimated to run between one month and 45 days. Some users haven't filled their entire needs because some sizes are in tight supply. These users will be quickly affected if shipments are held up by a steel strike.

New England consumers report their cold-finished bar stocks are comfortable. Hot-rolled bar stocks also are noticeably improved. With few exceptions, carbon bar users in the area can coast over the next several weeks. Except for a few specialties, consumers in the district have been able to build inventories to a desired level as a hedge against price increase.

Delay in the placement of orders for 1957 automotive assemblies, points to delivery pressure for bar tonnage later this quarter, probably next month. Heaviest demand is expected from the forge shops which have been ordering only light tonnage of late.

Although west coast bar sellers are booked solidly through August, it appears that many area consumers who anticipated additional purchases



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2. service **4. research**

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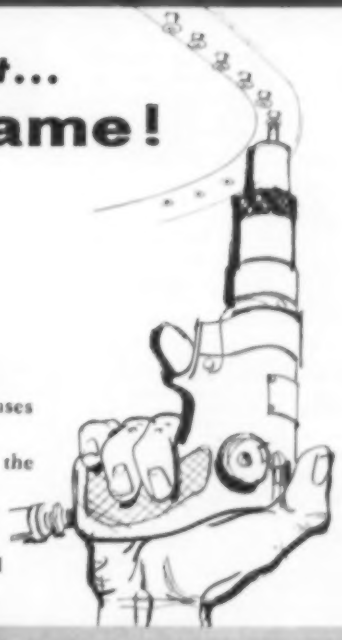
American Gives You More of All Four

. . . *in service*, where American's controlled servicing meets any production schedule . . . a furniture manufacturer, for instance, uses more than 7 million American Phillips fasteners a year.

. . . *in quality*, where American's quality standards are highest in the industry to assure conformance of every product run.

. . . *in research* that has developed not only the original Phillips Head fastener but saved an aircraft manufacturer substantial sums by showing him how to change from a costly stainless steel fastener machined from bar stock to a sturdy cold-headed unit.



If this sounds unique in the industry, it is. For nowhere will you find more of the four basic features you want than from American Screw Company — price, service, quality, research.

Make your own comparisons . . . send us your inquiry for price and delivery or your specifications for special fasteners. Write:

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in the late summer and fall will reduce their buying. If this should develop, producers say September and fourth quarters sales will fall noticeably short of expectations.

Tin Plate . . .

Tin Plate Prices, Page 106

The tin mills continued under pressure for shipments right up to the end of June. Consumers sought to get in as much tonnage as possible to protect themselves against a summer shortage if there is a steel strike. The possibility of higher steel prices was of no concern. Tin plate prices are not set until the fourth quarter.

Even should demand for cold-rolled sheets fail to pick up sharply in the third quarter, flat-rolled producers are not particularly concerned since such failure will simply permit them to divert a larger tonnage of raw steel to their tin mills where no easing in demand is indicated.

Wire . . .

Wire Prices, Pages 106 & 107

Consumers' inventories of manufacturers, heading, spring and industrial wire items are estimated to average 45 days. Heaviest backlogs are in the larger sizes of low carbon grades required for reinforcing, including concrete pipe, mesh, highway strand and prestressed structures. Users of these grades are generally holding less than a 45-day supply.

Third quarter demand for high carbon wire lags in New England, August schedules being 50 to 60 per cent booked. Although there is some increase in covering for later this quarter, more sellers are skeptical as to the volume likely to be required when active buying on automotive account is resumed.

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 104

Reinforcing bars are not in as short supply as structural steel and piling. Bookings are heavy, however, and recently the mills have noted a pickup in volume as more building projects switched to reinforced construction because of the shortage of structurals.

Concrete bar shipments for the second quarter have been heavier of late, both direct to jobs and to fabricating-distributor shops. Delivery on considerable tonnage is still some weeks in the future, including 4400 tons for Connecticut bridges.

Tubular Goods . . .

Tubular Goods Prices, Page 108

Tubular goods continue in exceptionally tight supply. On electricweld and seamless, the mills are sold out into 1957. Buttweld is in a less strong position, but, of late, order volume has been substantial.

Some industrial construction projects in northern Ohio have been delayed by pipe shortages. In one instance, a substantial portion of needs is being supplied by jobbers.

Producers of specialties and mechanical tubing rushed out shipments in June to enter the third quarter with a reduced carry-over, compared with the opening of the second quarter. Some mills report their backlog of unfilled orders for specialty tubing still is larger than they like.

Late in June it appeared that users of oil country goods would be hardest hit in event of a strike at tube plants. In some cases, well drilling operations would have to be suspended in two to three weeks, especially by small drillers. Larger drillers, it was said, could probably get along on supplies for six weeks to two months.

No users are reported holding sizable stocks of high-alloy oil country tubing, and stoppage of shipments of that item could slow down well drilling operations in a month.

Commercial pipe distributors in the

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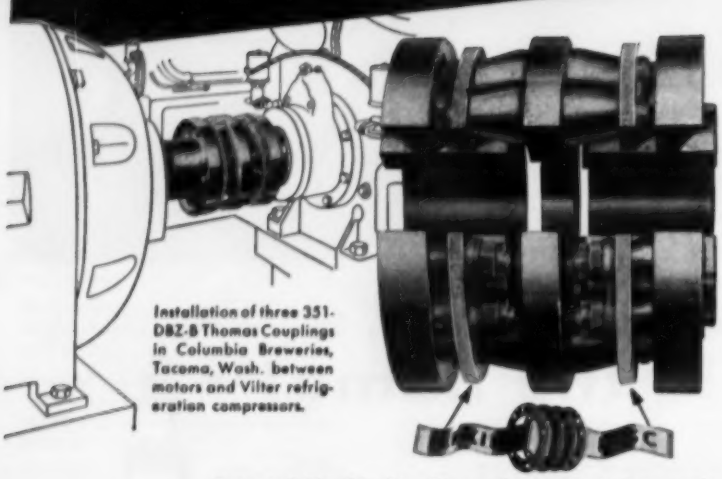
for more years of better service!



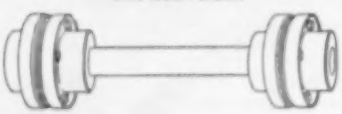
Installation of three 351-DBZ-B Thomas Couplings in Columbia Breweries, Tacoma, Wash. between motors and Vilter refrigeration compressors.

Patented Flexible Disc Rings of special steel transmit the power and provide for parallel and angular misalignment as well as free end float.

DISTINCTIVE ADVANTAGES

FACTS	EXPLANATION
NO MAINTENANCE	Requires No Attention. Visual Inspection While Operating.
NO LUBRICATION	No Wearing Parts. Freedom from Shut-downs.
NO BACKLASH	No Loose Parts. All Parts Solidly Bolted.
CAN NOT "CREATE" THRUST	Free End Float under Load and Misalignment. No Rubbing Action to cause Axial Movement.
PERMANENT TORSIONAL CHARACTERISTICS	Drives Like a Solid Coupling. Elastic Constant Does Not Change. Original Balance is Maintained.

THOMAS COUPLINGS ARE MADE FOR A WIDE RANGE OF SPEEDS, HORSEPOWER AND SHAFT SIZES.



Write for our new Engineering Catalog No. 51A

THOMAS FLEXIBLE COUPLING COMPANY
Largest Exclusive Coupling Manufacturer in the World
WARREN, PENNSYLVANIA, U.S.A.

East were reported well stocked before the end of the second quarter.

Pacific Gas & Electric Co., San Francisco, has started work on a $10 million addition to its "super-inch" main. Three sections of 34-in. steel pipe will be used in the 85 mile line.

Fasteners . . .

Bolt, Nut, Rivet Prices, Page 107

Pittsburgh Screw & Bolt Corp., Pittsburgh, will purchase the fastener division of Oliver Iron & Steel Corp., Pittsburgh. Oliver produces nuts, bolts and screws in addition to pole line hardware, which it will retain. Oliver's inventories of fasteners will be available to fill orders of either company. No date has been set for the purchase.

Pig Iron . . . .

Pig Iron Prices, Page 109

Blast furnace production (pig iron and ferroalloys) totaled 6,920,942 tons in May, reports the American Iron & Steel Institute. Of the total, 6,873,102 tons were iron and 47,840 tons, ferroalloys. A year ago, output amounted to 6,804,935 tons, of which 6,753,236 tons were iron, and 51,699 ferroalloys.

Output in the first five months of this year was 34,617,329 tons, of which 34,342,956 tons were iron, and 304,373 tons, ferroalloy in the like period of 1955 production totaled 30,940,547 tons, of which 30,673,656 tons were pig iron, and 51,699 tons were ferroalloys.

Production By Districts
(Net Tons)

District	May–1956 P'g Iron	May–1956 Ferro-alloys	May–1955 Pig Iron	May–1955 Ferro-alloys
Eastern	1,458,256	22,565	1,389,018	25,551
Pittsburgh-Youngstown	2,501,514	18,694	2,319,402	20,710
Cleveland-Detroit	850,580	.....	802,014	.....
Chicago	1,418,023	.....	1,383,151	.....
Southern	287,829	6,581	545,648	5,438
Western	356,900	.....	314,003	.....
Total	6,873,102	47,840	6,753,236	51,699

Despite the approach of hot weather and vacations which reduce consumption, pig iron business through June was better than normal.

In the Chicago district, sellers experienced a hectic month, with foundries requesting shipments of more iron than could be supplied.

Since the bulk of these shipments was motivated by the possibility of a suspension of blast furnace operations and to some extent by a desire to stock up at prices lower than those that likely will apply after midyear, pig iron sellers figure they may be facing a lean 60 days. The situation is aggravated by the fact many foundries will be closed for vacations the next few weeks.

Foundries in upstate New York have a good backlog of orders that will insure a high rate of output when production is resumed after vacations. This should mean steady demand for merchant iron in the latter part of July and August.

Republic Steel Corp. closed down one of its six blast furnaces in Cleveland on June 21 for relining. The furnace has a rated annual capacity of 516,000 net tons. The repair job will take about 40 days. The decision to close down the furnace was not affected by the steel labor talks.

United States Steel Corp. closed down its No. 9 blast furnace at its Gary Works on June 21 for general rebuilding. The stack was rebuilt in 1927 and relined in 1951. It has a rated annual capacity of 351,100 net tons.

Wheeling Steel Corp. removed its No. 2 blast furnace at the North Works in Steubenville, O., for the first complete relining since 1943. Minor lining repairs were made to the stack in 1947 and 1949. Since it was completely relined in 1943, the fur-

(*Please turn to page* 120)

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Current Ferroalloy Quotations

MANGANESE ALLOYS

Spiegeleisen: Carlot, per gross ton, Palmerton, Pa. 21-23% Mn, $96.50; 19-21% Mn, 1-3% Si, $94; 16-19% Mn, $92.

Standard Ferromanganese: (Mn 74-76%, C 7% approx.) Base price per net ton $215. Duquesne, Johnstown, Sheridan, Pa.; Philo, O.; Tacoma, Wash.; Alloy, W. Va.; Ashtabula, Marietta, O.; Sheffield, Ala.; Portland, Oreg. Add or subtract $2 for each 1% or fraction thereof of contained manganese over 76% or under 74%, respectively.

(Mn 79-81%). Lump $223 per net ton, f.o.b. Anaconda or Great Falls, Mont. Add $2.60 for each 1% above 81%; subtract $2.60 for each 1% below 79%, fractions in proportion to nearest 0.1%.

Low-Carbon Ferromanganese, Regular Grade: (Mn 85-90%). Carload, lump, bulk, max, 0.07% C, 31.95c per lb of contained Mn, carload packed 33c, ton lots 34.5c, less ton 35.7c. Delivered. Deduct 1.5c for max 0.15% C grade from above prices, 3c for max 0.30% C, 3.5c for max 0.50% C, and 6.5c for max 75% C—max 7% Si. **Special Grade:** (Mn 90% min, C 0.07% max, P 0.06% max). Add 2.05c to the above prices. Spot, add 0.25c.

Medium-Carbon Ferromanganese: (Mn 80-85%, C 1.25-1.5%, Si 1.5% max). Carload, lump, bulk 22.85c per lb of contained Mn, packed, carload 23.9c, ton lot 25.5c, less ton 26.7c. Delivered. Spot, add 0.25c.

Manganese Metal: 2" x D (Mn 95.5% min, Fe 2% max, Si 1% max, C 0.2% max). Carload, lump, bulk, 45c per lb of metal; packed, 45.75c; ton lot 47.25c; less ton lots 49.25c. Delivered. Spot, add 2c.

Electrolytic Manganese Metal: Min carload, 31.5c; 2000 lb to min carload, 33.5c; 250 lb to 1999 lb, 35.5c; less than 250 lb, 36.5c. Premium for hydrogen-removed metal, 0.75c per lb. Prices are f.o.b. cars, Knoxville, Tenn., freight allowed to St. Louis or to any point east of Mississippi; or f.o.b. Marietta, O. freight allowed.

Silicomanganese: (Mn 65-68%). Contract, lump, bulk 1.50% C grade, 18-20% Si, 12c per lb of alloy. Packed, c.l. 13c, ton 13.45c, less ton 14.45c, f.o.b. Alloy W. Va., Ashtabula, O., Marietta, O., Sheffield, Ala., Portland, Oreg. For 2% C grade, Si 15-17%, deduct 0.2c from above prices. For 3% C grade, Si 12-14.5%, deduct 0.4c from above prices. Spot, add 0.25c.

TITANIUM ALLOYS

Ferrotitanium, Low-Carbon: (Ti 20-25%, Al 3.5% max, Si 4% max, C 0.10% max). Contract, ton lot 2" x D, $1.50 per lb of contained Ti; less ton $1.55. (Ti 38-43%, Al 8% max, Si 4% max, C 0.10% max). Ton lot $1.35, less ton $1.37 f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis. Spot, add 5c.

Ferrotitanium, High-Carbon: (Ti 15-18%, C 6-8%). Contract $200 per ton, f.o.b. Niagara Falls, N. Y., freight allowed to destinations east of Mississippi river and north of Baltimore and St. Louis.

Ferrotitanium, Medium-Carbon: (Ti 17-21%, C 2-4.5%). Contract $225 per ton, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.

CHROMIUM ALLOYS

High-Carbon Ferrochrome: Contract, c.l., lump, bulk 26.25c per lb of contained Cr; c.l. packed 27.5c, ton lot 29.25c, less ton 30.65c. Delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome: (Cr 67-71%). Contract, carload, lump, bulk, C 0.025% max (Simplex) 32.50c per lb contained Cr, 0.02% max 39.25c, 0.03% max 38.75c, 0.06% max 37.25c, 0.1% max 36.75c, 0.15% max 36.50c, 0.2% max 36.25c, 0.5% max 36.00c, 1.0% max 35.25c, 1.5% max 35.10c, 2.0% max 35.00c. Ton lot, add 3.1c, less ton add 4.8c. Carload packed add 1.45c. Delivered. Spot, add 0.25c.

Foundry Ferrochrome, High-Carbon: (Cr 62-66%, C 5-7%, Si 7-10%). Contract, c.l. 2 in. x D, bulk 27.4c per lb contained Cr. Packed, c.l. 28.7c, ton 30.5c less ton 32c. Delivered. Spot, add 0.25c.

Foundry Ferrosilicon Chrome: (Cr 50-54%, Si 28-32%, C 1.25% max). Contract, carload, packed 8 M x D, 19.6c per lb of alloy, ton lot 20.85c; less ton lot, 22.05c. Delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome-Silicon: (Cr 39-41%, Si 42-49%, C 0.05% max). Contract, carload, lump, 4" x down and 2" x down, bulk, 29.05c per lb of contained Cr; 1" x down, bulk 39.8c. Delivered.

Chromium Metal, Electrolytic: Commercial grade (Cr 99.8% min, metallic basis, Fe 0.2% max). Contract, carlot, packed 2" x D plate (about ¼" thick) $1.25 per lb, ton lots $1.27, less ton lots $1.29. Delivered. Spot, add 5c.

VANADIUM ALLOYS

Ferrovanadium: Open-hearth Grade (V 50-55%, Si 5% max., C 3% max). Contract, any quantity, $3.10 per lb of contained V. Delivered. Spot, add 10c. **Special Grade** (V 50-55% or 70-75%, Si 2% max, C 0.5% max) $3.20. **High Speed Grade** (V 50-55%, or 70-75%, Si 1.50% max, C 0.20% max) $3.30.

Grainal: Vanadium Grainal No. 1, $1.05 per lb; No. 6, 68c; No. 79, 58c, freight allowed.

Vanadium Oxide: Contract, less carload lots, packed, $1.33 per lb contained V_2O_5, freight allowed. Spot, add 5c.

SILICON ALLOYS

25-30% Ferrosilicon: Contract, carload, lump, bulk, 20.6c per lb of contained Si. Packed 21.40c; ton lot 22.50c f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.

50% Ferrosilicon: Contract, carload, lump, bulk, 12.75c per lb of contained Si. Packed, c.l. 14.85c, ton lot 16.3c, less ton 17.95c. F.o.b. Alloy, W. Va., Ashtabula, Marietta, O., Sheffield, Ala., and Portland, Oreg. Spot, add 0.45c.

Low Aluminum 50% Ferrosilicon: (Al 0.40% max). Add 1.2c to 50% ferrosilicon prices.

65% Ferrosilicon: Contract, carload, lump, bulk, 14.5c per pound contained silicon. Packed, c.l. 16.2c, ton lot, 18c; less ton, 19.35c. Delivered. Spot, add 0.35c.

75% Ferrosilicon: Contract, carload, lump, bulk, 15.4c per lb of contained Si. Packed, c.l. 17.05c, ton lot 18.7c, less ton 19.95c. Delivered. Spot, add 0.3c.

90% Ferrosilicon: Contract, carload, lump, bulk, 18.5c per lb of contained Si. Packed, c.l. 19.95c, ton lot 21.35c, less ton 22.4c. Delivered. Spot, add 0.25c.

Silicon Metal: (Min 98% Si, 0.75% max Fe, 0.07% max Ca). C.l. lump, bulk 20.5c per lb of Si. Packed, c.l. 21.95c, ton lot 23.25c, less ton 24.25c. Add 0.5c for max 0.03 Ca grade. Deduct 0.5c for max 2% Fe grade analyzing min 96.5% Si. Spot, add 0.25c.

Alsifer: (Approx. 20% Al, 40% Si, 40% Fe). Contract, basis f.o.b. Niagara Falls, N. Y., lump, carload, bulk, 10.65c per lb of alloy, ton lot, packed, 11.8c.

ZIRCONIUM ALLOYS

12-15% Zirconium Alloy: (Zr 12-15%, Si 39-43%, C 0.20% max). Contract, c.l. lump, bulk 8.5c per lb of alloy. Packed, c.l. 9.5c, ton lot 10.65c, less ton 11.5c. Delivered. Spot, add 0.25c.

35-40% Zirconium Alloy: (Zr 35-40%, Si 47-52%, Fe 8-12%, C 0.50% max). Contract, carload, lump, packed 26.25c per lb of alloy, ton lot 27.4c, less ton 28.65c. Freight allowed. Spot, add 0.25c.

BORON ALLOYS

Ferroboron: (B 17.50% min, Si 1.50% max, Al 0.50% max, C 0.50% max). Contract, 100 lb or more 1" x D, $1.20 per lb of alloy; less than 100 lb $1.30. Delivered. Spot, add 5c. F.o.b. Washington, Pa., prices, 100 lb and over, are as follows: Grade A (10 14% B) 85c per pound; Grade B (14-18% B) $1.20; Grade C (19% min B) $1.50.

Boroll: (3 to 4% B, 40 to 45% Si). $5.25 per lb contained B, delivered to destination.

Bortam: (B 1.5%-1.9%). Ton lots, 45c per lb; smaller lots, 50c per lb.

Carbortam: (B 1 to 2%). Contract, lump, carloads 9.50c per lb, f.o.b. Suspension Bridge, N. Y., freight allowed same as high-carbon ferrotitanium.

CALCIUM ALLOYS

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18% and Si 53-59%). Contract, carload, lump, bulk 22c per lb of alloy, carload packed 23.05c, ton lot 24.95c, less ton 25.95c. Delivered. Spot, add 0.25c.

Calcium-Silicon: (Ca 30-33%; Si 60-65%, Fe 1.5-3%). Contract, carload, lump, bulk 23.00c per lb of alloy, carload packed 24.45c, ton lot 26.75c, less ton 28.25c. Delivered. Spot, add 0.25c.

BRIQUETTED ALLOYS

Chromium Briquets: (Weighing approx. 3½ lb each and containing 2 lb of Cr). Contract, carload, bulk, 16.95c per lb of briquet, carload packed in box pallets 17.15c, in bags 17.85c; 3000 lb to c.l. in box pallets 18.35c; 2000 lb to c.l. in bags, 19.05c; less than 2000 lb in bags 19.95c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Ferromanganese Briquets: (Weighing approx. 3 lb and containing 2 lb of Mn). Contract, carload, bulk 13c per lb of briquet, c.l. packed, pallets 13.2c, bags 14c; 3000 lb to c.l., pallets 14.4c; 2000 lb to c.l. bags, 15.2c, less ton 16.1c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicomanganese Briquets: (Weighing approx. 3½ lb and containing 2 lb of Mn and approx. ½ lb of Si). Contract, c.l. bulk 13.55c per lb of briquet, c.l. packed, pallets, 13.75c; bags 14.55c, 3000 lb to c.l., pallets, 14.95c; 2000 lb to c.l., bags, 15.75c; less ton 16.65c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicon Briquets: (Large size—weighing approx. 5 lb and containing 2 lb of Si). Contract, carload, bulk 7.15c per lb of briquet; packed, pallets, 7.35c; bags 8.15c; 3000 lb to c.l., pallets, 8.95c; 2000 lb to c.l. bags 9.75c; less ton 10.65c. Delivered. Spot, add 0.25c.

(Small size—Weighing approx. 2½ lb and containing 1 lb of Si). Carload, bulk 7.3c. Packed, pallets 7.5c; bags 8.30c; 3000 lb to c.l. pallets 9.1c; 2000 lb to c.l. bags 9.9c; less ton 10.8c. Delivered. Add 0.25c for notching, small size only. Spot, add 0.25c.

Molybdic-Oxide Briquets: (Containing 2½ lb of Mo each) $1.33 per pound of Mo contained, f.o.b. Langeloth, Pa.

TUNGSTEN ALLOYS

Ferrotungsten: (70-80%). 5000 lb W or more $3.45 per lb of contained W; 2000 lb W to 5000 lb W, $3.55; less than 2000 lb W, $3.67. Delivered.

OTHER FERROALLOYS

Ferrocolumbium: (Cb 50-60%, Si 8% max, C 0.4% max). Contract, ton lot, 2" x D, $6.90 per lb of contained Cb. Delivered. Spot, add 10c

Ferrotantalum—Columbium: (Cb 40% approx., Ta 20% approx., and Cb plus Ta 60% min C 0.30% max). Ton lots, 2" x D, $4.65 per lb of contained Cb plus Ta, delivered; less ton lots $4.70.

SMZ Alloy: (Si 60-65%, Mn 5-7%, Zr 5-7%, Fe 20% approx.) Contract, c.l. packed ½-in. x 12 M, 18.5c per lb of alloy, ton lots 19.65c, less ton 20.9c. Delivered. Spot, add 0.25c.

Graphidox No. 5: (Si 48-52%, Ca 5-7%, Ti 9-11%). C.l. packed, 18.5c per lb of alloy, ton lots 19.65c; less ton lots 20.9c, f.o.b. Niagara Falls, N. Y.; freight allowed to St. Louis.

V-5 Foundry Alloy: (Cr 38-42%, Si 17-19%, Mn 8-11%). C.l. packed 17.2c per lb of alloy; ton lots 18.7c; less ton lots 19.95c, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis.

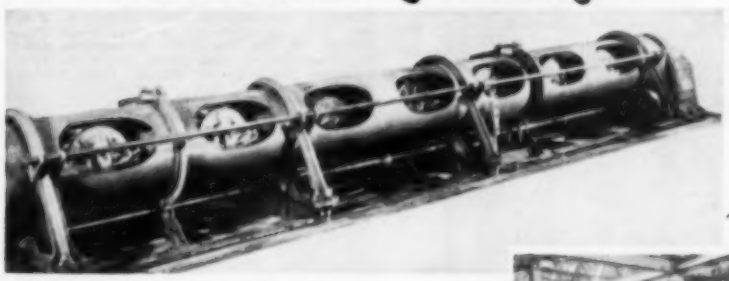
Simanal: (Approx. 20% each Si, Mn, Al; bal. Fe). Lump, carload, bulk 17.50c. Packed c.l. 18.50c, 2000 lb to c.l. 19.50c, less than 2000 lb 20c per lb of alloy. Delivered.

Ferrophosphorus: (23-25% based on 24% P content with unitage of $4 for each 1% of P above or below the base); carload, f.o.b. sellers' works, Mt. Pleasant, Siglo, Tenn., $90 per gross ton.

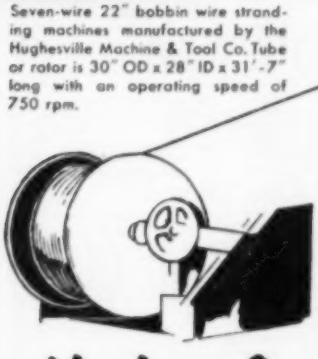
Ferromolybdenum: (55-75%). Per lb contained Mo, in 200-lb containers, f.o.b. Langeloth, Pa., $1.54 in all sizes except powdered which is $1.66; Washington, Pa., furnace, any quantity $1.46.

Technical Molybdic-Oxide: Per lb contained Mo, f.o.b. Langeloth, Pa.; $1.31 in cans; in bags, $1.30, f.o.b. Langeloth, Pa.; $1.24. Washington, Pa.

In the Wire-Stranding Industry...



Seven-wire 22" bobbin wire stranding machines manufactured by the Hughesville Machine & Tool Co. Tube or rotor is 30" OD x 28" ID x 31'-7" long with an operating speed of 750 rpm.



Higher Speed-Higher Production- through ACIPCO *centrifugally spun* STEEL TUBES

Wire stranding machines manufactured by the Hughesville Machine & Tool Co. are the standard of the industry. Acipco centrifugally spun steel tubes are the standard at Hughesville. They say: "We stress the use of your tubes in the manufacture of our stranding machines."

Why? Their answer: "Higher speeds and production have been obtained in the wire stranding and cabling industries through the use of centrifugally spun steel strander tubes. These higher speeds are obtained due to the fact that centrifugally spun tubes maintain their dimensional and rotational stability for many years, even though many large openings are cut in the tubes for lowering bobbins of wire inside the tube."

If your tubular applications require quality tubes, inherently stable, durable, and easier to machine, investigate Acipco's complete production facilities. You will find that Acipco tubes, supplied to your exact physical and metallurgical specifications, can mean lower costs and higher production for you.

Acipco tubes now serve manufacturers of equipment for the aircraft, chemical, paper, petroleum, steel, textile, and other industries.

SIZE RANGE: Lengths up to 16' — longer lengths by welding tubes together. OD's from 2.25" to 50"; wall thicknesses from .25" to 4".

ANALYSES: All alloy grades in steel and cast iron, including heat and corrosion resistant stainless steels; plain carbon grades and special non-standard analyses.

FURNISHED: As cast, rough machined, or finish machined, including honing.

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Ores

Lake Superior Iron Ore

(Prices effective for the 1956 shipping season, gross ton, 51.50% iron natural, rail of vessel, lower lake ports.)

Old range bessemer	$11.25
Old range nonbessemer	11.10
Mesabi bessemer	11.00
Mesabi nonbessemer	10.85
Open-hearth lump	12.10
High phos.	10.85

The foregoing prices are based on upper lake rail freight rates, lake vessel freight rates, handling and unloading charges, and taxes thereon, which were in effect Dec. 1, 1955, and increases or decreases after such date are for seller's account.

Eastern Local Iron Ore

Cents per unit, deld. E. Pa.

Foundry and basic 52-62% concentrates contract	17.00-18.00

Foreign Iron Ore

Cents per unit, c.i.f Atlantic ports

Swedish basic, 65%	25.00
N. African hematite (spot)	nom. 24.00-25.00
Brazilian iron ore, 68-69%	33.00

Tungsten Ore

Net ton unit, before duty

Foreign, wolframite, good commercial quality	$33.00-$35.50
Domestic, scheelite, mine	63.00

Manganese Ore

Mn 48%, delivery within six months, $1.30-$1.35 nom., per long ton unit, c.i.f. U. S. ports, duty for buyer's account; 46-47%, $1.05-$1.10 nom.

Chrome Ore

Gross ton, f.o.b. cars New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., Tacoma, Wash.

Indian and African

48% 2.8:1	nom. $45.00-$50.00
48% 3:1	42.00-44.00
48% no ratio	34.00

South African Transvaal

44% no ratio	$26.00-$28.00
48% no ratio	33.00-35.00

Domestic

Rail nearest seller

48% 3:1	$39.00

Molybdenum

Sulphide concentrate, per lb of Mo content, mines, unpacked	$1.10

Antimony Ore

Per unit of Sb content, c.i.f. seaboard

55-60%	$3.40-$3.85
60-65%	3.85-3.95

Vanadium Ore

Cents per lb V_2O_5 content, deld. mills

Domestic	31.00

Refractories

Fire Clay Brick (per 1000)

High-Heat Duty: Ashland, Grahn, Hayward, Hitchins, Hoffman, Olive Hill Ky., Athens, Troup, Tex., Beech Creek, Clearfield, Curwensville, Lock Haven, Lumber, Orviston, West Decatur, Pa., Bessemer, Ala., Parber, Mexico, St. Louis, Vandalia, Mo., Ironton, Oak Hill, Parral, Portsmouth, O., Ottawa, Ill., Stevens Pottery, Ga., $122; Salina, Pa., $127; Niles O., $133.

Super-Duty: Ironton, O., Vandalia, Mo., Olive Hill, Ky., Clearfield, Pa., New Savage, Md., St. Louis, $150.

Silica Brick (per 1000)

Standard: Alexandria, Clayeburg, Mt. Union, Sproul, Pa., Ensley, Ala., Windham, Portsmouth, O., Hawstone, Pa., $128; Warren, Niles, O., Hays, Pa., $133; Morrisville, Pa., $131.50; E. Chicago, Ind., Joliet, Rockdale, Ill., $138; Lehigh, Utah, $144; Los Angeles, $151.

Super Duty: Hays, Sproul, Hawstone, Pa., Niles, Warren, Windham, O., Leslie, Md., Athens, Tex., $145; Morrisville, Pa., $148; Joliet, Ill., $151; Curtner, Calif., $163.

Semisilica Brick (per 1000)

Clearfield, Pa., $139; Philadelphia, $124; Woodbridge, N. J., $122.

Ladle Brick (per 1000)

Dry Pressed: Alsey, Ill., Chester, New Cumberland, W. Va., Freeport, Johnstown, Merrill Station, Pa., Mexico, Vandalia, Mo., $88.50; Wellsville, O., $92.50; Clearfield, Pa., Portsmouth, O., $94.

High-Alumina Brick (per 1000)

50 Per Cent: St. Louis, Mexico, Vandalia, Mo., $194; Danville, Ill., $197; Philadelphia, Clearfield, Pa., $201.

60 Per Cent: St. Louis, Mexico, Vandalia, Mo., $241; Danville, Ill., $244; Philadelphia, Clearfield, Pa., $248.

70 Per Cent: St. Louis, Mexico, Vandalia, Mo., $279 Danville, Ill., $281; Philadelphia, Clearfield, Pa., $286.

Sleeves (per 1000)

Reesdale, Johnstown, Bridgeburg, Pa., $157; Clearfield, Pa., $158.50; St. Louis, $169.30.

Nozzles (per 1000)

Reesdale, Pa., $253.70; Johnstown, Pa., $259.20; Clearfield, Pa., $259.40; St. Louis $259.45; Bridgeburg, Pa. $258.

Runners (per 1000)

Reesdale, Johnstown, Bridgeburg, Pa., $198; Clearfield, Pa., $199; St. Louis, $195.80.

Dolomite (per net ton)

Domestic, dead-burned, bulk Biltmeyer, Blue Bell, Williams, Plymouth Meeting, York, Pa., Millville, W. Va., Bettsville, Millersville, Martin, Woodville, O., Gibsonburg Narlo, O., $15; Thornton, McCook, Ill., $15.60; Dolly Siding, Bonne Terre Mo., $14.

Magnesite (per net ton)

Domestic, dead-burned, bulk ½-in. grains with fines: Chewelah, Wash., $40; Luning, Nev., $40. ⅝-in grains with fines: Baltimore, $66.40.

Metallurgical Coke

Price per net ton

Beehive Ovens

Connellsville, furnace	$13.75-14.50
Connellsville, foundry	16.00-17.00

Oven Foundry Coke

Birmingham, ovens	$25.65
Cincinnati, deld.	30.58
Buffalo, ovens	27.50
Buffalo, deld.	28.75
Camden, N. J., ovens	26.50
Chicago, ovens	27.00
Detroit, ovens	27.50
Detroit, deld.	28.75
Pontiac, deld.	29.15
Saginaw, deld.	30.73
Erie, Pa., ovens	27.50
Everett, Mass., ovens	
New England, deld.	*28.55
Indianapolis, ovens	26.75
Ironton, O., ovens	26.00
Cincinnati, deld.	28.59
Kearny, N. J., ovens	26.75
Lone Star, Tex., ovens	19.50
Milwaukee, ovens	27.50
Neville Island, (Pittsburgh) Pa., ovens	26.25
Painesville, O., ovens	27.50
Cleveland, deld.	29.43
Philadelphia, ovens	26.50
St. Louis, ovens	28.50
St. Paul, ovens	26.50
Swedeland, Pa., ovens	26.50
Terre Haute, Ind., ovens	26.75

*Or within $4.55 freight zone from works.

Coal Chemicals

Spot, cents per gallon, ovens

Pure benzene	36.00
Toluene, one deg.	32.00-31.00
Industrial xylene	32.00-35.00

Per ton, bulk, ovens

Ammonium sulfate	$32.00
Birmingham area	36.00

Cents per pound, producing point

Phenol: Grade 1, 15.00; Grade 2-3, 14.50; Grade 4, 16.50; Grade 5, 15.25.

Fluorspar

Metallurgical grades, f.o.b. shipping point, in Ill., Ky., net tons, carloads, effective CaF_2 content 72.5%, $38-$39; 70%, $35-$36; 60% $31-$32. Imported, net tons, f.o.b. cars point of entry, duty paid, metallurgical grade: European, $34; Mexican, $26.50.

Electrodes

Threaded with nipple, unboxed, f.o.b. plant

Diam	Length	Per 100 lb
GRAPHITE		
Inches		
2	24	$52.50
2½	30	33.75
3	40	32.00
4	40	30.25
5½	40	30.00
6	60	27.25
7	60	26.75
8, 9, 10	60	24.25
12	72	27.25
14	60	23.50
16	72	22.50
17	60	23.00
18	72	22.50
20	72	22.25
CARBON		
8	60	12.10
10	60	11.80
12	60	11.75
14	60	11.70
14	72	10.85
17	60	10.75
17	72	10.35
20	84	10.30
20	90	10.10
24	72, 84	10.30
24	96	10.05
30	84	10.20
40, 35	110	9.90
40	100	9.90

News from Hamilton!

100 to 300 ton press line sets new standards

Here's Hamilton's brand new high-speed 250-ton, double-crank press with 60" x 36" bed and slide

For the first time in the industry, Hamilton gives you 100 to 300 ton presses built to meet exacting automotive production standards . . . standards pioneered in the automotive field through more than thirty years of Hamilton press leadership.

Every one of these 2-point, single acting, straight-side, double-crank presses is a brand new design. Each is engineered for constant top-speed, top-quality production—without profit-robbing downtime. Each is built for complete operating flexibility. Here are just a few of Hamilton's built-in extras that mean more operating profit for *you:*

- rugged welded steel construction
- mechanically interlocked air clutch and brake
- barrel-type motorized slide adjustment
- automatic lubrication
- pneumatic flywheel brake
- die lights
- die cushions
- pneumatic counterbalances
- interlocked electrical clutch control

Exact specifications are adjustable to your individual requirements. Special electrical controls are available to meet particular electrical standards.

It will mean money in your pocket to find out today how these all-new Hamilton presses can help you turn out high quality stampings fast . . . without costly production downtime. Get the full story on these new standards for 100 to 300 ton presses . . . from Hamilton Division, BLH Corporation, Hamilton, Ohio.

HAMILTON DIVISION
BALDWIN-LIMA-HAMILTON
DIVISIONS: Austin-Western • Eddystone • Electronics & Instrumentation • Lima • Loewy-Hydropress • Madsen • Pelton • Standard Steel Works

(*Concluded from page 115*)

nace has produced nearly 3.5 million tons of pig iron. It is scheduled to resume production in about six weeks.

Warehouse . . .

Warehouse Prices, Page 109

Warehouse business wound up the last month at a fast clip, although there was no avalanche of orders from small manufacturers.

Not only was there uncertainty as to a strike in the steel industry, which would cut off mill shipments, but there was an active demand for steel for maintenance at various manufacturing establishments. Many firms will take the opportunity afforded by mass vacation suspensions over the next few weeks to make needed repairs to plant and equipment.

Distributors have virtually no inventory in shapes or plates. Over past weeks they have been moving this material out just about as fast as it has been received.

One large distributor in the East estimates stocks of cold sheets at around 80 to 90 per cent of normal. Hot-rolled sheets, pickled and oiled, are well under that percentage. Distributors in that district are fairly well stocked on hot-rolled carbon bars.

Canada . . .

Canadian iron and steel production continues to move upward. In April, output was 287,083 net tons, comparing with 292,642 in March and 272,187 in April, 1955. For the four months ended April, 1956, production totaled 1,133,266 net tons, against 962,456 in the like period last year.

Production of steel ingots and castings in April was 434,066 net tons against 440,725 in March and 360,754 in April, last year.

In the first four months this year, steel output totaled 1,709,129 net tons, including 1,669,788 of steel ingots and 39,341 of steel castings. This compares with a total of 1,383,419 net tons, including 1,355,753 tons of steel ingots and 27,666 tons of castings, in the like period of 1955.

Steel Import Prices

(Base per 100 lb, landed, duty paid. Source of shipment: Western continental European countries)

	North Atlantic	South Atlantic	Gulf Coast	West Coast
Deformed Bars, Intermediate, ABTM-A-305	$6.80	$6.80	$6.80	$7.20
Bar Size Angles	6.75	6.75	6.75	7.15
Structural Angles	7.05	7.05	7.05	7.45
I-Beams	7.45	7.45	7.45	7.85
Plates	8.50	8.50	8.50	8.90
Sheets, H.R.	8.75	8.75	8.75	9.15
Sheets, C.R. (drawing quality)	9.10	9.10	9.10	9.45
Furring Channels, C.R., 1000 ft, ⅞ x 0.20 lb per ft	26.50	26.50	26.50	30.46
Barbed Wire (†)	6.50	6.50	6.50	6.85
Merchant Bars	6.80	6.80	6.80	7.20
Hot-Rolled Bands	7.10*	7.10*	7.10*	7.50*
Wire Rods, Thomas Commercial No. 5	6.50	6.50	6.50	6.90
Wire Rods, O-H Cold Heading Quality No. 5	6.90	6.90	6.90	7.30
Bright Common Wire Nails	7.50	7.50	7.50	7.80

Oil Country Pipe: Prices on all sizes equalized with Pittsburgh plus barge freight to New Orleans and Houston, where available.

*Nominal. †Per 82-lb. net, reel. ‡Per 100-lb kegs, 20d nails and heavier

ELECTRIC FURNACE
STEEL CASTINGS
CARBON-ALLOY-STAINLESS
SAND OR SHELL MOLDED

"C" Steel Castings—sand or shell molded—possess qualities far more interesting than the mere strength of steel. For, in addition to strength they provide more efficient design—better weight-strength ratio—and greater fatigue resistance, i.e., longer life and less replacement. Furthermore "C" Steel Castings, because they are truly foundry engineered from pattern to final casting, require minimum machining and provide better fit plus fast assembly.

If you are interested in castings the know-how, experience and engineering knowledge of our staff are at your service upon request.

Crucible Steel Casting Co.
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To Lower your Overhead..
BROWNING ELECTRIC TRAVELING CRANES AND HOISTS
up to 125-TON CAPACITY
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famous for accuracy and straightness of threads, low chaser costs, less downtime, more pieces per day.
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ARTUS PLASTIC SLITTING MACHINE SHIMS
COST JUST A FRACTION OF METAL SPACERS
THE COLOR TELLS THE THICKNESS
ALWAYS RETAINS UNIFORMITY AND EVENNESS UNDER ALL NORMAL CONDITIONS
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INDUSTRIAL PRODUCTS SUPPLIERS 201 South Dean Street Englewood N J

Scrap . . .

Scrap Prices, Page 122

Philadelphia—Trading in scrap is at a practical standstill, with prices nominally unchanged. Any prolonged suspension in operations would result in an easing of prices, but basically the market is strong since stocks in dealers' yards are light. Both sellers and buyers are shying away from new contracts, pending developments in the wage negotiations.

Most district mills deferred shipments which could not be loaded on cars by June 22. Some later lifted this ban as facilities for storing scrap outside plant properties were provided.

Pittsburgh—There is virtually no buying activity, with buyers and sellers awaiting the outcome of the steel wage parley. Prices on the chief steelmaking grades are unchanged. However, cut structurals and heavy turnings are off $2 a ton. Cast iron grades also are down $2.

Boston—Activity in steel scrap is limited. Most contracts have been filled or have expired, with new buying light. Prices are not subject to much test, but tend to be soft.

Heavy shipments from yards until the past week or so have not seriously lowered supplies. Yards, however, are taking in less tonnage and have lowered prices on unprepared scrap. Industrial scrap production is off.

New York—Brokers have advanced buying prices on No. 1 heavy melting steel and No. 1 bundles to $41-$42, and on No. 2 heavy melting to $32-$33. This reflects buying by mill interests not presently threatened with a strike. Other grades are unchanged.

Buffalo—Scrap prices have declined around $3 a ton due to lack of mill buying and fear of a steel strike. Most prices are nominal. Dealers quote $42-$43 on No. 1 heavy melting, with No. 2 nominally $34 and No. 2 bundles $30-$31.

The mills shut off deliveries of scrap until the strike question is settled. This has had a bearish effect. Little scrap has been coming into dealers' yards.

Cast scrap is relatively firm, compared with the steel grades. The foundries have been taking metal steadily against old orders. New sales are expected to be made at lower prices.

Youngstown—The scrap market is dull as dealers and mills mark time, pending outcome of steel wage negotiations. Last reported sales of No. 1 material were at $49, No. 2 at $39.

Chicago—Uncertainty of steelmaking operations after June 30 weighed heavily on the scrap market here. By the start of last week, all except one of the large mills had effected cutoff of shipments to insure arrival of all cars before the end of the month. The exception is a company which owns its railroad and is in position to handle shipments that pile up. Under these conditions, the market is weak. Prices for the most part are unchanged. It is believed that any new buying might be negotiated at lower prices. Any cessation in steelmaking certainly will have a deteriorating effect. Cast scrap is suffering lack of demand because many foundries are down for early July vacations.

Cleveland—The scrap market was at a virtual standstill last week, pending the outcome of steel wage negotiations. For the most part prices are nominal in the absence of buying. Expectations are strength will return to the market in event an extended tieup of steel production is averted. Scrap supplies reportedly are not excessive and curtailed manufacturing operations over the summer months will tend to create a tight situation.

Cincinnati—The scrap market continues sluggish, pending outcome of the steel wage talks. Brokers say prices are nominal.

St. Louis—Brokers' buying prices are steady. A Missouri-Pacific sale of scrap (75 carloads of No. 1 heavy melting and other grades were disposed of) failed to weaken the market. This was regarded as a test because it could have saturated the area. Angles and splice bars are quoted up $1.50.

Generally, shipments are off, with purchases limited. But there is no oversupply here, and dealers can't acquire much additional tonnage at prevailing prices. An extended steel strike will knock the props from under the market it is thought.

Birmingham — With purchases halted and all orders not shipped by midnight June 22 canceled, the scrap market here has slowed to a walk. Mills seek to avoid demurrage on late arriving shipments if there is a strike at the end of June. One electric furnace in the area is still buying nearby scrap in limited quantities at prices about $1 off. Cast grades hold firm. The export market is featured by sporadic activity at South Atlantic and Gulf ports.

Los Angeles—Luria Bros. & Co. has a one-year lease with the Los Angeles Harbor Department on 200,000 sq ft of space at berth 136 in the West Basin of Los Angeles harbor. Two gantry cranes, each has 50 tons of capacity, were moved to the site

(Please turn to page 124)

One Sure Way to CUT COSTS!

use a C-F SHEET LIFTER

The A. B. Dick Company, Niles, Illinois, found that this C-F Lifter has substantially reduced man hours and crane time required to move stock in and out of storage.

Up to 10,000 lbs. of high grade sheets in varying widths may be picked up, carried and unloaded at shears or machines with speed and economy by the Lifter and its operator.

C-F Lifters are made in standard or semi-special models to handle from 2 to 60 tons. Bulletin SL-25 describes the advantages you can obtain from C-F Lifters. Write for it today.

CULLEN-FRIESTEDT CO.

1308 South Kilbourn Avenue • Chicago 23, Illinois

Iron and Steel Scrap

Consumer prices, per gross ton, except as otherwise noted, including broker's commission, as reported to STEEL. *Changes shown in italics.*

STEELMAKING SCRAP COMPOSITE

June 27	$46.00
June 20	46.00
Apr. Avg.	54.90
May 1953	34.87
May 1951	44.00

Based on No. 1 heavy melting grade at Pittsburgh, Chicago and eastern Pennsylvania.

PITTSBURGH

No. 1 heavy melting	44.00-45.00
No. 2 heavy melting	39.00-40.00
No. 1 bundles	44.00-45.00
No. 2 bundles	36.00-37.00
No. 1 busheling	44.00-45.00
Machine shop turnings	32.00-33.00
Mixed borings, turnings	32.00-33.00
Short shovel turnings	36.00-37.00
Cast iron borings	36.00-37.00
Cut structurals, 3 ft lengths	*50.00-51.00*
Heavy turnings	42.00-43.00
Punchings & plate scrap	*50.00-51.00*
Electric furnace bundles	*50.00-51.00*

Cast Iron Grades

No. 1 cupola	*48.00-49.00*
Charging box cast	*44.00-45.00*
Heavy breakable cast	*44.00-45.00*
Unstripped motor blocks	*32.00-33.00*
No. 1 machinery cast	*54.00-55.00*

Railroad Scrap

No. 1 R.R. heavy melt	51.50-52.50
Rails, 2 ft and under	65.00-66.00
Rails, 18 in. and under	66.00-67.00
Rails, random lengths	61.00-62.00
Railroad specialties	59.00-60.00

Stainless Steel Scrap

18-8 bundles & solids	360.00-375.00
18-8 turnings	255.00-270.00
430 bundles & solids	110.00-120.00
430 turnings	60.00-65.00

CLEVELAND

No. 1 heavy melting	*42.00-43.00*
No. 2 heavy melting	*31.00-34.00*
No. 1 bundles	*42.00-43.00*
No. 2 bundles	*30.00-31.00*
No. 1 busheling	*42.00-43.00*
Machine shop turnings	*25.00-26.00*
Mixed borings, turnings	*29.00-30.00*
Short shovel turnings	*29.00-30.00*
Cast iron borings	*29.00-30.00*
Low phos.	*44.00-45.00*
Cut structural plates 2 ft and under	51.00-52.00
Alloy free, short shovel turnings	37.00-38.00
Electric furnace bundles	*42.00-43.00*

Cast Iron Grades

No. 1 cupola	*52.00-53.00*
Charging box cast	*38.00-39.00*
Stove plate	*49.00-50.00*
Heavy breakable cast	*42.00-43.00*
Unstripped motor blocks	*27.00-28.00*
Brake shoes	*37.00-38.00*
Clean auto cast	*50.00-51.00*
Burnt cast	*37.00-38.00*
Drop broken machinery	*53.00-54.00*

Railroad Scrap

No. 1 R.R. heavy melt	49.00-50.00
R.R. malleable	54.00-55.00
Rails, 2 ft and under	62.50-63.50
Rails, 18 in. and under	61.00-62.00
Rails, random lengths	57.00-58.00
Cast steel	51.00-52.00
Railroad specialties	51.00-52.00
Uncut tires	52.00-53.00
Angles, splice bars	57.00-58.00
Rails, rerolling	61.00-62.00

Stainless Steel

(Brokers' buying prices; f.o.b. shipping point)

18-8 bundles, solids	345.00-355.00
18-8 turnings	205.00-215.00
430 clips, bundles, solids	100.00-110.00
430 turnings	50.00-60.00

YOUNGSTOWN

No. 1 heavy melting	*44.00-45.00*
No. 2 heavy melting	*33.00-34.00*
No. 1 bundles	*44.00-45.00*
No. 2 bundles	*31.00-32.00*
No. 1 busheling	*44.00-45.00*
Machine shop turnings	*26.00-27.00*
Short shovel turnings	*31.00-32.00*
Cast iron borings	*31.00-32.00*
Low phos.	*45.00-46.00*
Electric furnace bundles	*44.00-45.00*

Railroad Scrap

No. 1 R.R. heavy melt.	51.00-52.00

CHICAGO

No. 1 heavy melting	44.00-48.00
No. 2 heavy melting	36.00-37.00
No. 1 factory bundles	48.00-49.00
No. 1 dealer bundles	44.00-45.00
No. 2 bundles	33.00-34.00
No. 1 busheling	44.00-48.00
Machine shop turnings	23.00-24.00
Mixed borings, turnings	25.00-26.00
Short shovel turnings	25.00-26.00
Cast iron borings	25.00-26.00
Cut structurals, 3 ft	52.00-53.00
Punchings & plate scrap	53.00-54.00

Cast Iron Grades

No. 1 cupola	45.00-46.00
Stove plate	39.00-40.00
Unstripped motor blocks	32.00-33.00
Clean auto cast	47.00-48.00
Drop broken machinery	47.00-48.00

Railroad Scrap

No. 1 R.R. heavy melt	49.00-50.00
R.R. malleable	58.00-59.00
Rails, 2 ft and under	*65.00-66.00*
Rails, 18 in. and under	*66.00-67.00*
Angles, splice bars	62.00-63.00
Rails, rerolling	*66.00-67.00*

Stainless Steel Scrap

18-8 bundles & solids	380.00-395.00
18-8 turnings	270.00-280.00
430 bundles & solids	105.00-110.00
430 turnings	55.00-60.00

DETROIT

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	38.00
No. 2 heavy melting	32.00
No. 1 bundles	39.00
No. 2 bundles	27.50
No. 1 busheling	38.00
Machine shop turnings	23.00
Mixed borings, turnings	23.00
Short shovel turnings	27.00
Punchings & plate scrap	56.00

Cast Iron Grades

No. 1 cupola	46.00
Charging box cast	38.00
Stove plate	38.00
Heavy breakable	38.00
Unstripped motor blocks	25.00
Clean auto cast	51.00
Malleable	51.00

BIRMINGHAM

No. 1 heavy melting	34.00-35.00
No. 2 heavy melting	32.00-33.00
No. 1 bundles	34.00-35.00
No. 2 bundles	24.00-25.00
No. 1 busheling	34.00-35.00
Cast iron borings	20.00-21.00
Short shovel turnings	27.00-28.00
Machine shop turnings	25.00-26.00
Electric furnace bundles	40.00-41.00

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	48.50-49.50
Stove plate	47.00-48.00
Bar crops and plate	51.00-52.00
Structural & plate, 2 ft	*49.00-50.00*
Unstripped motor blocks	37.50-38.50
Charging box cast	32.00-33.00
No. 1 wheels	39.00-40.00

Railroad Scrap

No. 1 R.R. heavy melt.	45.00-46.00
Rails, 18-in. and under	60.00-61.00
Rails, rerolling	*64.00-65.00*
Rails, random lengths	56.00-57.00
Angles, splice bars	55.00-56.00

PHILADELPHIA

No. 1 heavy melting	47.00-48.00
No. 2 heavy melting	39.00-40.00
No. 1 bundles	47.00-48.00
No. 2 bundles	37.00-38.00
No. 1 busheling	47.00-48.00
Electric furnace bundles	50.00
Mixed borings, turnings	34.00
Machine shop turnings	32.00
Short shovel turnings	36.00-37.00
Heavy turnings	43.00-44.00
Structurals & plates	51.00-53.00
Couplers, springs, wheels	60.00
Rail crops, 2 ft & under	64.00

Cast Iron Grades

No. 1 cupola	48.00
Malleable	67.00
Heavy breakable cast	52.00
Drop broken machinery	54.00-56.00

NEW YORK

(Brokers' buying prices)

No. 1 heavy melting	*41.00-42.00*
No. 2 heavy melting	*32.00-33.00*
No. 1 bundles	*41.00-42.00*
No. 2 bundles	30.00-31.00
Machine shop turnings	20.00-21.00
Mixed borings, turnings	26.00-27.00
Short shovel turnings	27.00-28.00
Low phos. (structural & plate)	44.00-45.00

Cast Iron Grades

No. 1 cupola	44.00-45.00
Unstripped motor blocks	32.00-34.00
Heavy breakable	44.00-45.00

Stainless Steel

18-8 sheets, clips, solids	340.00-350.00
18-8 borings, turnings	170.00-180.00
430 sheets, clips, solids	120.00-125.00
410 sheets, clips, solids	100.00-105.00

BOSTON

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	38.00-38.50
No. 2 heavy melting	26.00-26.50
No. 1 bundles	36.00-36.50
No. 2 bundles	25.00-25.50
No. 1 busheling	36.00-36.50
Machine shop turnings	20.00-20.50
Mixed borings, turnings	23.00-23.50
Short shovel turnings	24.00-24.50
No. 1 cast	42.00-42.50
Mixed cupola cast	37.50-38.00
No. 1 machinery cast	43.50-44.00

BUFFALO

No. 1 heavy melting	*42.00-43.00*
No. 2 heavy melting	*31.00-34.00*
No. 1 bundles	*42.00-43.00*
No. 2 bundles	*30.00-31.00*
No. 1 busheling	*42.00-43.00*
Mixed borings, turnings	27.00-28.00
Machine shop turnings	*25.00-26.00*
Short shovel turnings	28.00-29.00
Cast iron borings	27.00-28.00
Low phos.	50.00-51.00

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	45.00-46.00
No. 1 machinery	50.00-51.00

Railroad Scrap

Rails, random lengths	54.00-55.00
Rails, 3 ft and under	59.00-60.00
Railroad specialties	50.00-51.00

CINCINNATI

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	42.00-43.00
No. 2 heavy melting	33.50-34.50
No. 1 bundles	42.00-43.00
No. 2 bundles	30.00-31.00
No. 1 busheling	42.00-43.00
Machine shop turnings	24.00-25.00
Mixed borings, turnings	28.00-29.00
Short shovel turnings	28.00-29.00
Cast iron borings	28.00-29.00
Low phos., 18 in.	51.00-52.00

Cast Iron Grades

No. 1 cupola	43.00-44.00
Heavy breakable cast	43.00-44.00
Craging box cast	43.00-44.00
Drop broken machinery	53.00-54.00

Railroad Scrap

No. 1 R.R. heavy melt.	49.00-50.00
Rails, 18 in. and under	65.00-66.00
Rails, random lengths	58.00-59.00

ST. LOUIS

(Brokers' buying prices)

No. 1 heavy melting	36.00
No. 2 heavy melting	34.00
No. 1 bundles	36.00
No. 2 bundles	30.00
No. 1 busheling	36.00
Machine shop turnings	†
Short shovel turnings	28.00

Cast Iron Grades

No. 1 cupola	44.00
Charging box cast	30.00
Heavy breakable cast	30.00
Unstripped motor blocks	30.00
Brake shoes	42.00
Clean auto cast	45.00
Stove plate	38.00

Railroad Scrap

No. 1 R.R. heavy melt.	49.50
Rails, 18 in. and under	62.00
Rails, random lengths	56.00
Rails, rerolling	70.00
Angles, splice bars	*53.50*

†Nominal

SEATTLE

No. 1 heavy melting	43.00-44.00
No. 2 heavy melting	39.00-40.00
No. 1 bundles	39.00-40.00
No. 2 bundles	30.00-31.00
No. 3 bundles	26.00
Machine shop turnings	23.00-25.00
Mixed borings, turnings	23.00-25.00
Electric furnace No. 1	52.00-54.00

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	42.00-45.00
Heavy breakable cast	36.00-38.00
No. 1 wheels	37.00
Unstripped motor blocks	40.00
Stove plate (f.o.b. plant)	30.00-31.00
Brake shoes	38.00

Railroad Scrap

Rails, random lengths	43.00-44.00

LOS ANGELES

No. 1 heavy melting	38.00
No. 2 heavy melting	32.00
No. 1 bundles	37.00
No. 2 bundles	28.00
Machine shop turnings	17.00

Cast Iron Grades (F.o.b. shipping point)

No. 1 Cupola	42.00

SAN FRANCISCO

No. 1 heavy melting	43.00
No. 2 heavy melting	40.00
No. 1 bundles	42.00
No. 2 bundles	35.00
Machine shop turnings	20.00-23.00
Mixed borings, turnings	20.00-23.00
Cast iron borings	20.00-23.00
Heavy turnings	20.00-23.00
Short shovel turnings	25.00
Cut structurals	45.00
Punchings & plate scrap	44.00

Cast Iron Grades

No. 1 cupola	48.00
Charging box cast	42.00
Stove plate	39.00
Heavy breakable cast	39.00
Unstripped motor blocks	38.00
Brake shoes	35.00
Clean auto cast	48.00
No. 1 wheels	39.00
Burnt cast	23.00
Drop broken machinery	50.00

HAMILTON, ONT

No. 1 heavy melting	43.00
No. 2 heavy melting	38.00
No. 1 bundles	43.00
No. 2 bundles	35.50
Mixed steel scrap	37.00
Busheling, new factory: Prepared	41.00
Unprepared	37.00
Short steel turnings	26.00

Cast Iron Grades†

No. 1 machinery cast	50.00

†F.o.b., shipping point.

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Over 12" to 14" Inclusive	7/16"	168" maximum, 24" minimum
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(*Concluded from page* 121)

from Long Beach, former headquarters for Luria's Los Angeles area operations. The Harbor Department will spend approximately $80,000 in preparing the dock for use.

First scrap shipments from the Los Angeles harbor berth are scheduled for mid-August, with most exports going to Japan. Luria's investment is believed to exceed $2.5 million and the company expects to export 400,000 tons of scrap before the end of 1956.

San Francisco—The scrap market is inactive here, with sellers and buyers awaiting the outcome of the steel labor contract negotiations.

Seattle—Scrap prices are nominal because of steel labor negotiations. Scrap exports continue active.

The quarterly sale of Puget Sound Navy Yard scrap attracted spirited bidding. About 1000 tons of prepared material were bid in at $43.72.

Rails, Cars . . .

Track Material Prices, Page 107

Domestic freight cars placed in May totaled 2403, down from 6599 in April, and 3041 in May a year ago, reports the American Railway Car Institute and the Association of American Railroads.

May deliveries totaled 6667 units, the highest since October, 1953, when 8727 were delivered. April deliveries amounted to 5943, while in May last year, 4083 were delivered.

Order backlogs were 133,072 as of June 1. This compared with 137,436 on May 1 and 16,886 a year ago.

Iron Ore . . .

Iron Ore Prices, Page 118

Shipments of Lake Superior iron ore totaled 2,916,411 gross tons in the week ended June 25, reports the Lake Superior Iron Ore Association. This was off slightly from the 2,995,835 tons moved in the like week a year ago.

Cumulative shipments of lake ore in the 1956 season to June 25 were 28,783,951 gross tons, 3,264,876 tons more than had been shipped in the 1955 season to that date.

Stocks of iron ore on docks and in furnace yards in the U. S. and Canada totaled 26,088,527 gross tons at the end of April, reports the Lake Superior Iron Ore Association. Of the total, 18,877,667 tons were Lake Superior ore; 2,470,648 tons, other U. S. ores; 495,206, Canadian Lake Superior ore; 1,283,933, other Canadian ores; foreign ores (other than Canadian), 2,961,073 tons.

Consumption totaled 11,019,922 tons in the month: Lake Superior ore, 7,145,713; other U. S. ores, 1,684,503;

Lake Superior Canadian ore, 310,971; other Canadian ores, 484,213; foreign ores (except Canadian), 1,394,522 tons.

Total consumption in the first four months of this year was 45,492,332 tons. Of this, 29,594,763 tons were Lake Superior ore; 7,033,462, other U. S. ores, 1,232,177, Canadian Lake Superior ore; 1,979,490, other Canadian ores; 5,652,440, foreign ores, other than those from Canada.

Metallurgical Coke . . .

Metallurgical Coke Prices, Page 118

Inland Steel Co. early last week started to dry out its new 87-oven No. 7 coke battery at Indiana Harbor, a procedure that will take 56 days. The company hopes to make the first charge of coal late in the summer, although the exact date will depend upon when the coal chemical by-product equipment is ready.

The battery's capacity of 1870 tons of carbonized coal daily will make Inland nearly independent of outside suppliers of coke. When the battery was first planned, it was thought that the added coking capacity would fill the company's coke needs. Since then, coke consumption of the blast furnaces has increased beyond expectations. It is estimated that blast furnace operations will require 500 to 600 tons more coke than the plant can produce.

Structural Shapes . . .

Structural Shape Prices, Page 104

Structural awards tapered throughout the greater part of June, reflecting an uncertain outlook for steel production and prices this summer. Not only was there hesitancy on the part of builders in submitting work for estimates, but there also was reluctance on the part of general contractors and fabricators to bid on some work that came out.

In the East, awards were noticeably light as the month ended. Inquiry, however, was reported accumulating, with fabricators' inventories of structurals light despite their efforts to get in as much tonnage as possible before the new month opened.

The largest single project pending in the New York market is the 60-story skyscraper for the Chase Manhattan bank in lower Manhattan, involving 48,000 tons. The next largest job in the East is the Hudson river bridge between Albany and Rensselaer counties, requiring 13,085 tons.

New England structural fabricators cannot maintain schedules should shape shipments be cut off by a shutdown at the mills. Most area shops have been losing ground for the last two months, and their steel inventories are pretty well depleted.

Receipt of less tonnage through May-June will restrict fabricators' shipments through August. For some weeks, area shops have been cautious in booking forward orders. In most cases, shipments were behind schedule. Bridge builders are extended 12 to 14 months on the final batch of Connecticut turnpike structures taking 8000 tons.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

2200 tons, power plant extension, Montaub Electric Co., Somerset, Mass., to the Bethlehem Steel Co., Bethlehem, Pa.; Stone & Webster Engineering Corp., Boston, engineer-contractor.

1200 tons, commercial equipment plant, General Electric Co., Gainesville, Fla., to E. L. Montague.

500 tons, power house, Pacific Power & Light Co., Glen Rock, Wyo., through Ebasco Services, New York, to an unnamed fabricator.

415 tons, junior and senior high school, Bucktown, Pa., to Reading Metalcraft Co., Reading, Pa.

230 tons, three state bridges, beam spans, Manchester, N. H., to Bancroft & Martin Rolling Mills Co., South Portland, Me.; Manchester Sand & Gravel Co., Manchester, general contractor.

210 tons, building, Charlotte, N. C., to Ford, Bacon & Davis, New York, to the O'Neal Steel Works Co., Birmingham.

135 tons, transformer and switching structures, Public Service Co. of Colorado, Denver, through Ebasco Services, New York, to Schuler Engineering Co.

120 tons, aluminum foundry, American Brake Shoe Co., Mahwah, N. J., to Sanworth Hughes.

110 tons, state bridge work, Nassau county, New York, through Lizza & Sons, to Carl Koch Co., Bronx, New York.

STRUCTURAL STEEL PENDING

13,085 tons, Hudson river bridge, Albany and Rensselaer counties, New York; bids closed June 28.

4500 tons, state office building, Philadelphia, John McShane, that city, low on general contract.

2850 tons, 13 grade structures and two bridges, stream and railroad crossings, Connecticut turnpike project 326-01, Montville-Norwich; Merritt-Chapman & Scott Corp., Boston, general contractor; also 1150 tons, reinforcing bars, and 705 tons, steel piling.

2500 tons, eight grade structures, Connecticut turnpike project 327-01, Norwich-Lisbon; Brunalli Construction Co., Southington, Conn., and M. A. Gammino Construction Co., Providence, R. I., joint general contractors; also, 970 tons, reinforcing bars, and 715 tons, steel piling.

800 tons, state institutional building, Luzerne county, Pa., John McShane low on general contract; project may be readvertised later as bids exceeded the appropriation.

700 tons, junior and senior high school, Dallastown, Pa.; bids asked.

585 tons, five grade structures, Connecticut turnpike project 325-01, Waterford-Montville; Arute Bros., Middletown, Conn., general contractor; also, 475 tons of reinforcing bars.

450 tons, high school, Radnor, Pa.; bids asked.

210 tons, state bridge, St. James avenue, Springfield, Mass.

200 tons, two state bridges, beam spans, Providence, R. I.; Campanella & Cardi Construction Co., Hillsgrove, R. I., low on general contract.

REINFORCING BARS . . .

REINFORCING BARS PLACED

555 tons, Washington state Maple street bridge, Spokane, to Bethlehem Pacific Coast Steel

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Corp., Seattle; Morrison-Knudsen Co., Seattle, general contractor, low at $874,552.

275 tons, Washington state Maple street bridge, Spokane, to U. S. Steel Corp.

85 tons, Washington state Thurston county bridge, to Bethlehem Pacific Coast Steel Corp., Seattle; T. T. Burnham, Seattle, general contractor at $102,034.

REINFORCING BARS PENDING

3000 tons, Washington state viaduct addition, Seattle; Morrison-Knudsen Co. and Rumsey & Co., Seattle, joint low and awarded at $2,826,615.

116 tons, Washington state Thurston county overcrossing; bids to Olympia, Wash., July 10.

100 tons, Oregon state 120-ft girder bridge, Benton county; bids to Portland, Oreg., July 12.

100 tons, battalion headquarters and other structures, Redmond and Midway guided missile centers, near Seattle; John P. Hopkins Co. Inc., Mercer Island, Wash., low at $679,458.

PLATES . . .

PLATES PLACED

1155 tons, 10 and 14-in. sheet steel piling, east approach to Morrison street bridge, Portland, Oreg.; divided between U. S. Steel and Bethlehem Pacific Coast Steel Corp., Seattle.

346 tons, piling for Morrison street bridge approach, Portland, Oreg., to unstated interest; also 446 tons, 10-in. 57-lb H piling for Hawthorne street bridge, Portland, divided between U. S. Steel and Bethlehem. Manson Construction & Engineering Co., Seattle, is general contractor.

PLATES PENDING

700 tons, second phase of the Mercer Island water supply system; bids to Seattle July 3; alternative bids for concrete pipe invited.

PIPE . . .

CAST IRON PIPE PLACED

877 tons, various sizes for Hillsboro, Oreg., to U. S. Pipe & Foundry Co., Seattle.

186 tons, for Ketchikan, Alaska, to U. S. Pipe & Foundry Co., Seattle.

185 tons, system expansion for Shelton, Wash., to U. S. Pipe & Foundry Co., Seattle.

143 tons, for Portland, Oreg., to U. S. Pipe & Foundry Co., Seattle.

140 tons, various sizes, Petersburg, Alaska, to U. S. Pipe & Foundry Co., Seattle.

40 tons, 6-in., Astoria, Oreg., to U. S. Pipe & Foundry Co., Seattle.

STEEL PIPE PENDING

Unstated, 6600 ft of 20-in.; b'ds to Joseph G. Ryan, clerk, Port Townsend, Wash., July 17.

RAILS, CARS . . .

LOCOMOTIVES PLACED

Ontario Northland, six 1750-hp diesel-electric road switching units, to Diesel Division, General Motors Corp., Detroit.

Santos A Jundiai Railway, Brazil, forty-five 720-hp diesel-electric units, to General Electric Co., Schenectady, N. Y.

Southern Pacific, 154 diesel-electric locomotive units, to Electro-Motive Division, General Motors Corp., La Grange, Ill., Alco Products Ind., Schenectady, N. Y., and Fairbanks, Morse & Co., Chicago; equipment comprises 90 freight diesels and 64 diesel switchers costing $24 million.

RAILROAD CARS PLACED

Fruit Growers Express, 900 refrigerator cars; 400 to Pacific Car & Foundry Co., and 500 to the Express company's Alexandria, W. Va., shops; requirements were previously reported as involving 1000 refrigerator cars, all of which were to be built in Alexandria.

North American Car Corp., 125 seventy-ton covered hopper cars to Pullman-Standard Car Mfg. Co., Chicago.

RAILROAD CARS PENDING

Reading, 100 seventy-ton covered cement hopper cars; bids asked.

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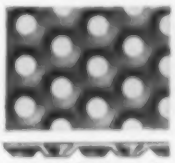
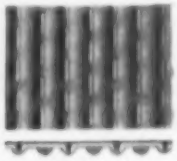
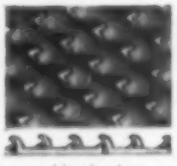


Small Indented Round Holes

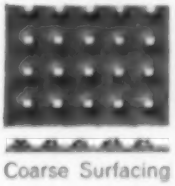


Indented Slots

1/16" Triangular Stabbed Holes



Hooked Stabbed Holes



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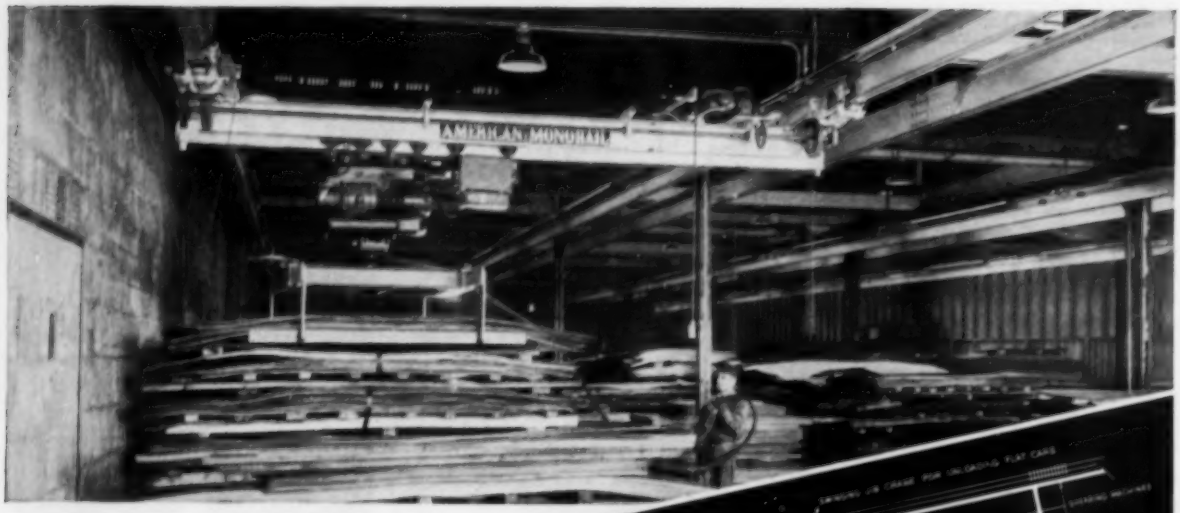

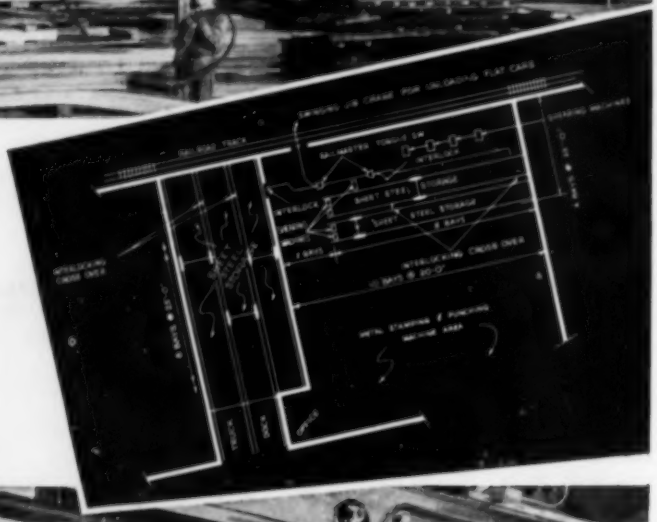

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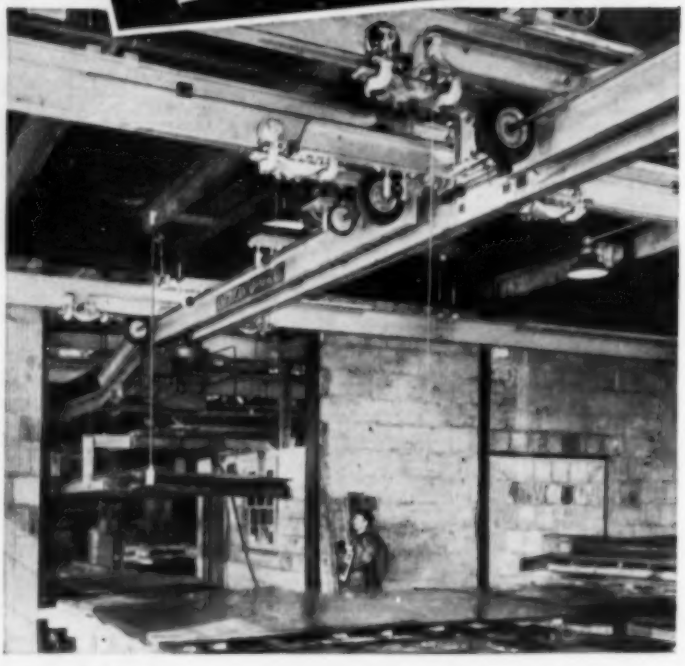

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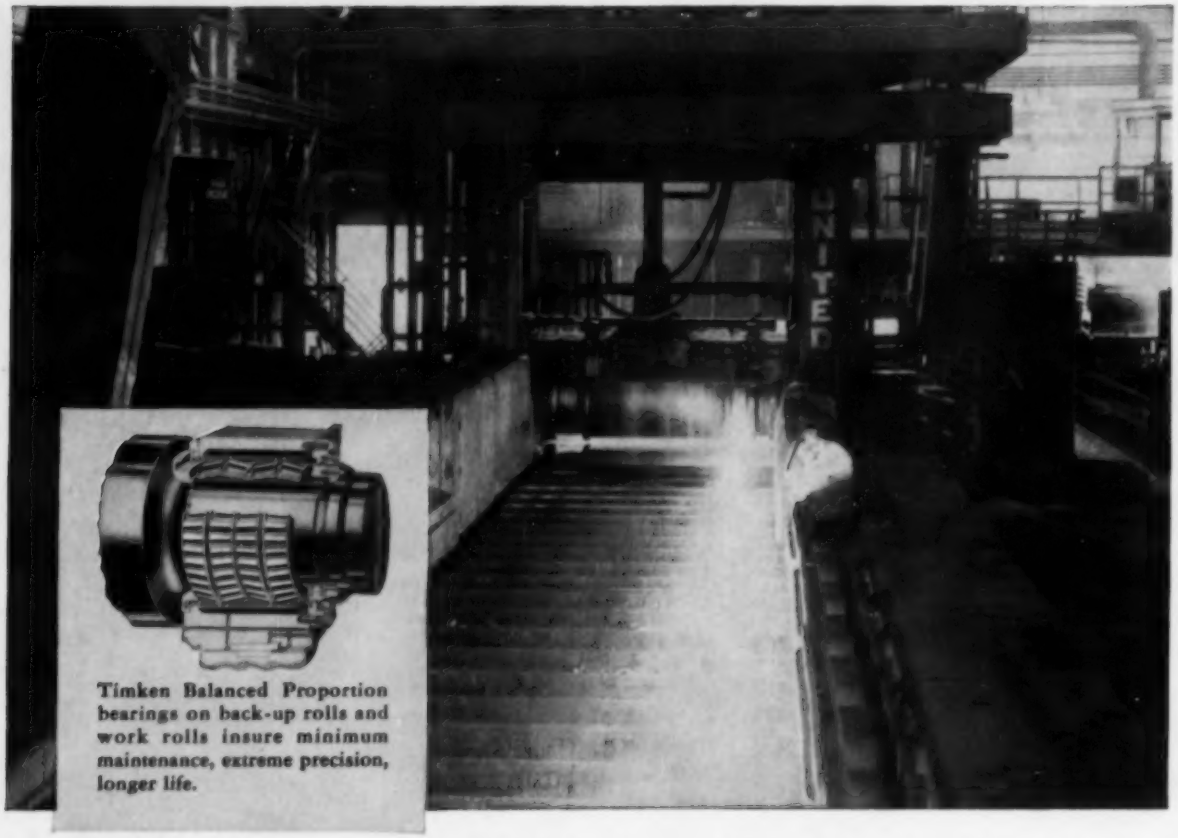

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